

CONTENTS

	PAGE
MAGNETIC FIELD OF THE SUN (OBSERVATIONAL), <i>Robert Howard</i> . . .	1
ON THE INTERPRETATION OF STATISTICS OF DOUBLE STARS, <i>Alan H. Batten</i>	25
ASTRONOMICAL OPTICS, <i>I. S. Bowen</i>	45
WAVES IN THE SOLAR ATMOSPHERE, <i>E. Schatzman and P. Souffrin</i> . .	67
DETERMINATION OF MASSES OF ECLIPSING BINARY STARS, <i>Daniel M. Popper</i>	85
MASSES OF VISUAL BINARY STARS, <i>O. J. Eggen</i>	105
ASTRONOMICAL FABRY-PEROT INTERFERENCE SPECTROSCOPY, <i>Arthur H. Vaughan, Jr.</i>	139
OBSERVING THE GALACTIC MAGNETIC FIELD, <i>H. C. van de Hulst</i> . . .	167
OH MOLECULES IN THE INTERSTELLAR MEDIUM, <i>B. J. Robinson and R. X. McGee</i>	183
STRUCTURE OF THE SOLAR CORONA, <i>Gordon Newkirk, Jr.</i>	213
ON THE ORIGIN OF THE SOLAR SYSTEM, <i>D. ter Haar</i>	267
ULTRAVIOLET AND X RAYS FROM THE SUN, <i>Leo Goldberg</i>	279
EXTRASOLAR X-RAY SOURCES, <i>Philip Morrison</i>	325
ENERGETIC PARTICLES FROM THE SUN, <i>C. E. Fichtel and F. B. McDonald</i>	351
QUASI-STELLAR OBJECTS, <i>E. Margaret Burbidge</i>	399
THE DYNAMICS OF DISK-SHAPED GALAXIES, <i>C. C. Lin</i>	453
ROTATING FLUID MASSES, <i>N. R. Lebovitz</i>	465
GAMMA RADIATION FROM CELESTIAL OBJECTS, <i>G. G. Fazio</i>	481
THERMONUCLEAR REACTION RATES, <i>William A. Fowler, Georgeanne R. Caughlan, and Barbara A. Zimmerman</i>	525
STELLAR EVOLUTION WITHIN AND OFF THE MAIN SEQUENCE, <i>Icho Iben, Jr.</i>	571
COSMOLOGY, <i>I. D. Novikov and Ya. B. Zeldovič</i>	627
RELATED ARTICLES APPEARING IN OTHER <i>Annual Reviews</i>	649
INDEXES	651
AUTHOR INDEX	651
SUBJECT INDEX	662
CUMULATIVE INDEX OF CONTRIBUTING AUTHORS, VOLUMES 1 TO 5 .	692
CUMULATIVE INDEX OF CHAPTER TITLES, VOLUMES 1 TO 5 . . .	693

AUTHOR INDEX

A

Abraham, P. B., 396
 Abrami, A., 98
 Abt, H. A., 30, 32, 33, 96
 Acton, L. W., 248, 313, 322, 334, 336, 518
 Adams, B., 595
 Adgie, R. L., 210, 401, 425
 Agogino, M., 336, 513, 519, 521
 Agy, V. L., 386
 Aizu, K., 441
 Ajzenberg-Selove, F., 534, 545, 546, 547, 548, 559, 560, 561
 Alburger, D. E., 563
 Alexander, E., 288
 Alfvén, H., 2, 267, 271, 272, 273, 389, 447
 Allen, C. W., 217, 224, 238, 239, 247, 261, 262, 279, 296, 330, 340
 Allen, J. W., 297, 300
 Allen, L. R., 425
 Aller, H. D., 423
 Aller, L. H., 299, 303, 304, 383, 384
 Almqvist, E., 564
 Alpher, R. A., 639
 Alterman, Z., 474
 Aly, F. M., 561
 Ambartsunian, V. A., 38, 446, 630
 Anand, S. P. S., 472
 Anderson, B., 425
 Anderson, E. C., 336, 482, 517
 Anderson, K. A., 251, 352, 365
 Andrews, D. H., 26, 39, 98
 Andriilat, H., 416
 Andriilat, Y., 416
 Antonova, T. D., 233
 Antouliev, Y. P., 561
 Antrack, D., 231, 240, 244, 245
 Archer, S., 417, 431

Armstrong, A. H., 521
 Arnold, J. R., 336, 482, 517
 Arp, H. C., 409, 410, 411, 428, 429, 433, 436, 606, 607, 608
 Athay, R. G., 248, 296, 299, 301, 305
 Aubzeid, M. A., 561
 Austin, W. E., 281, 283, 284, 288, 290, 291, 293, 296, 306, 318
 Axford, W. I., 241, 396
 Axtell, J., 215

B

Babcock, H. D., 6, 8, 11, 12, 17, 19
 Babcock, H. W., 1, 2, 6, 7, 8, 11, 12, 17, 19, 149, 231
 Backus, G., 474
 Badawy, O. E., 561
 Bahcall, J. N., 347, 409, 410, 416, 436, 437, 438, 525, 532, 539, 541, 562, 563, 629
 Bahng, J., 80, 590
 Bailey, D. K., 351
 Bailey, G. M., 542, 548
 Baize, P., 107, 110, 122, 131
 Baker, J. G., 48, 50, 58
 Baker, N., 606
 Baker, R. H., 88
 Bakos, G. A., 99
 Baldwin, J. E., 417, 431
 Ball, J. A., 192, 193, 194, 195, 196, 197, 198, 200
 Baranik, A. T., 561
 Baranne, A., 51
 Barbanis, B., 461
 Barber, D. R., 425, 426
 Barnes, R. C., 32, 418
 Barnothy, J. M., 447
 Barnothy, M. F., 447
 Barrett, A. H., 183, 184, 186, 187, 188, 189, 190, 192, 193, 200, 206
 Bartels, J., 241, 261

Bartley, W. C., 234, 352, 371, 376, 390
 Bartolini, C., 29
 Bates, B., 161
 BATTEN, A. H., 25-44; 33, 37
 Baumeister, P. W., 161
 Becchi, C., 638
 Beckers, J. M., 3, 4
 Bednarova-Novakova, B., 17
 Beer, R., 162
 Beggs, D. W., 19
 Behr, A., 167, 168, 178
 Bell, B., 262
 Belton, M. J. S., 241, 245
 Benn, J., 556
 Bennett, A. S., 417
 Bennett, W. R., Jr., 163, 287
 Bens, A. R., 159
 Berkhuijsen, E. M., 172
 Berlage, H. P., 267, 268, 269, 270, 271
 Bertaud, C., 32
 Bethe, H. A., 325, 534, 536
 Betz, H. T., 163
 Beyer, R. T., 71
 Biermann, K., 169, 170, 171
 Biermann, L., 231, 240, 241, 244, 245
 Biggs, E. S., 32
 Billings, D. E., 225, 226, 227, 238, 239, 243, 244, 247, 248, 249, 250, 253, 254, 262
 Binnendijk, L., 28, 41, 124
 Bird, G. A., 81, 82
 Birmingham, T. J., 257
 Biswas, S., 362, 363, 366, 382, 383, 388
 Blaauw, A., 30, 37, 454
 Black, W. S., 281
 Blackwell, D. E., 214, 216, 218
 Blackwell, K. C., 124
 Blake, R. L., 286, 308, 310, 311, 318

- Blatt, J. M., 529
 Bleeker, J. A. M., 336
 Bleksley, A. E. H., 38
 Bless, R. C., 86
 Boccaletti, D., 411
 Bodansky, D., 565
 Bodenheimer, P., 87, 471, 598
 Bohlin, J. D., 241, 242, 244, 263
 Boisshot, A., 223, 224, 247, 249, 250, 255
 Boldt, E., 332, 334
 Bologna, J. M., 177
 Bolton, J. G., 183, 187, 188, 189, 192, 200, 207, 208, 401, 409, 410, 416, 417, 426, 430, 431, 433
 Bondi, H., 411
 Bonnevier, B., 447
 Bonnor, W. B., 643
 Booker, D., 281
 Booth, R. S., 210
 Borelli, F., 548
 Bouwers, A., 46, 48
 BOWEN, I. S., 45-66; 46, 57, 58, 61
 Bowen, P. J., 315, 316, 321
 Bowyer, S., 333, 334, 336, 518, 520
 Boyd, R. L. F., 279
 Bracciosi, A., 521
 Bradley, D. J., 161
 Bradt, H., 332, 333, 334, 336, 341, 346, 348, 517, 519, 521
 Braginskii, V. B., 638
 Brandstatter, J. J., 73
 Brandt, J. C., 240, 241, 243, 245
 Bray, R. J., 1
 Brennan, J. G., 541, 562
 Brini, D., 336, 518
 Brinkley, S. R., 81
 Bromley, D. A., 564
 Broten, N. W., 172
 Brouw, W. N., 172
 Brown, R. E., 543, 549, 563
 Brownlee, R. R., 571, 596
 Bruce, C. F., 143
 Brückner, G., 254
 Brunner-Hagger, W., 15
 Brussel, M. K., 545
 Bryant, D. A., 352, 359, 360, 366, 373, 375, 376, 377, 378, 379, 391, 396
 Buchdahl, H. A., 411
 Bugoslavskaya, E. Y., 220, 225, 228, 229, 237, 238, 243
 Buisson, H., 140, 145
 Bukata, R. P., 234, 352, 371, 376, 390
 Bumba, V., 6, 9, 11, 12, 14, 15, 17, 19, 20, 253
 BURBIDGE, E. M., 399-452; 399, 406, 407, 408, 409, 410, 412, 413, 414, 415, 416, 417, 419, 421, 422, 424, 425, 430, 432, 436, 438, 439, 441, 446, 500, 525, 559, 564, 571
 Burbidge, G. R., 338, 399, 407, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 424, 425, 430, 432, 433, 434, 435, 436, 438, 439, 441, 446, 485, 489, 500, 502, 506, 507, 509, 510, 525, 559, 564, 571, 635
 Burch, C. R., 48, 59
 Burger, J. J., 336
 Burgess, A., 247, 297, 500
 Burke, B. F., 194, 195, 196, 197, 198, 200
 Burlaga, L. F., 362, 396
 Burton, W. M., 281, 283, 308, 310
 Byram, E. T., 315, 328, 332, 333, 334, 336, 518, 520
 C
 Cameron, A. G. W., 267, 277, 347, 384, 412, 440, 488, 489, 499, 624
 Cameron, R. C., 609
 Candler, C., 149
 Cannon, R. D., 422
 Cantarano, S., 234
 Carathéodory, C., 46
 Carmichael, H., 359, 373
 Carter, J. C., 193, 195, 200
 CAUGHLAN, G. R., 525-70; 525, 535, 539, 542, 543, 548, 552, 563
 Ceccarelli, M., 521
 Cester, B., 89
 Chabbal, R., 144, 145, 157, 159
 Chaffee, F. R., 32
 Chamberlain, J. W., 241
 Chandrasekhar, S., 38, 442, 465, 467, 468, 472, 473, 474, 475, 476, 477, 478, 576, 592
 Chang, C. C., 214, 215, 242, 244, 246, 249, 252
 Chapman, S., 241, 251, 261
 Charvin, P., 255
 Chavira, E., 403
 Chernov, A. S., 642
 Chertok, J. M., 257
 Chisholm, J. H., 243, 244, 247
 Chisnell, R. E., 82
 Chiu, H. Y., 347, 595, 638
 Chodil, C., 328, 342
 Chretien, M. H., 48
 Christiansen, W. N., 223, 224, 247, 255
 Christie, W. H., 58
 Christy, R. F., 500, 530, 543, 606, 621, 623
 Chubb, T. A., 286, 308, 310, 311, 315, 318, 328, 332, 333, 334, 336, 518, 520
 Chudakov, A. E., 516, 520, 521
 Chupka, W. A., 638
 Ciriegi, V., 336, 518
 Clark, B. G., 189, 191, 425
 Clark, G., 334, 337, 517, 519, 521
 Clark, G. W., 336, 513, 517, 519, 520, 521
 Clarke, J. F., 71
 Clarke, M. E., 401
 Clarke, R. W., 401, 410, 416
 Clayton, D. D., 500, 510, 563, 565
 Clement, J. D., 548
 Clement, M., 474, 478
 Cline, T. C., 521
 Cline, T. L., 171, 352, 359, 360, 366, 368, 369, 373, 375, 376, 377, 378, 379, 391, 396
 Cobb, R., 328, 482, 519, 521
 Cocconi, G., 328
 Code, A. D., 61, 140, 160
 Coffeen, M. F., 86
 Cogger, L. L., 152, 159
 Cohen, J. G., 614, 615
 Cohen, M. H., 233, 255, 425, 426
 Cole, D. J., 172, 417
 Cole, D. S., 417
 Coleman, P. J., 245
 Colgate, S. A., 81, 414, 440
 Collins, G. W., 602
 Condon, E. U., 538
 Conner, J. P., 314
 Connes, P., 140, 159
 Contopoulos, G., 453
 Conway, R. G., 425
 Cook, C. W., 557
 Cooks, A. H., 203
 Cooper, A. J., 210
 Cooper, R. H., 238, 239
 Courtès, G., 140, 145, 146, 147, 148
 Couteau, P., 108
 Cowan, R. D., 288
 Cowley, A. P., 408, 409
 Cowling, T. G., 472, 473, 474, 475, 478
 Cox, J. P., 572, 596

Craddock, W. L., 500,
510
Craddock, W. L., Jr., 337,
520
Crampin, J., 605
Crannell, H. L., 557, 563
Crawford, A. E., 163
Cretin, M., 466
Critchfield, C. L., 498
Crowther, J. H., 210
Crowther, P. P., 194, 195,
196, 197, 198
Cruvellier, P., 147
Cudaback, D. D., 194,
195
Culhane, J. L., 316, 321
Culshaw, W., 205
Cunningham, A. A., 192

D

Dadykin, V. L., 516, 520,
521
Dally, E. B., 556
Danielson, R. E., 521
Darwish, D. A. E., 561
Davids, C., 543, 547
Davies, L. B., 150, 162
Davies, R. D., 177, 193,
210
Davis, L., 169, 170, 171,
245
Davis, L. R., 352
Davis, R., Jr., 563
Davis, R. D., Jr., 563
Davis, S. P., 161
Davisson, C. M., 492
Day, G. A., 417
d'Azambuja, L., 238, 239
d'Azambuja, M., 238, 239
Dedekind, R., 468
Deinzer, W., 564
de Jager, C., 69, 70, 76,
193, 194, 236, 242, 253,
294, 295, 314, 316, 318,
321
Delvaile, J. P., 521
Demarque, P., 121, 123,
617, 620
Denisse, J. F., 223, 224,
247, 255
Dennison, E. W., 157
Dent, W. A., 422, 423, 425,
426, 433
de Sabbata, V., 411
Desai, U. D., 352, 359, 360,
366, 373, 375, 376, 377,
378, 379, 391, 396
Dessler, A. J., 241
Detwiller, C. R., 293,
295
Deutsch, A. J., 232
Deutschman, W. A., 288
Dibai, E. A., 408, 412, 421,
424
Dicke, R. H., 627, 633,
635

Dieter, N. H., 183, 191, 192,
193, 199
Divan, L., 416, 417
Dive, P., 467
Dizer, M., 228, 263
Doberck, W., 106
Dodson, H. W., 16
Dodson-Prince, H., 223, 224,
247, 255
Dolan, J. F., 511, 519
Dollfus, A., 215, 237
Domingo, V., 517, 519,
521
Donahue, T. M., 496
Donaldson, W., 425, 426
Doroshkevich, A. G., 631,
635, 642, 643, 645
Drazin, P. G., 475
Duck, I., 543
Dufour, C., 152
Dunham, T., 139, 157
Dunn, R. B., 56
Dupeyrat, R., 163
Dupree, A. K., 296, 300,
301
Duthie, J. G., 328, 336, 482,
518, 519, 521
Dwarakanath, M. R., 542,
563
Dworetsky, M. M., 85

E

Eckart, C., 72, 73,
474
Eckers, J., 401, 410
Eddington, A. S., 467
Eddy, J. A., 255
Edge, D. P., 417, 431
Edmonds, F. N., Jr., 74,
75
Efremov, Yu. I., 26,
420
EGGEN, O. J., 105-38; 28,
41, 86, 88, 97, 103, 106,
110, 112, 113, 114, 115,
116, 118, 119, 120, 121,
122, 123, 124, 125, 598,
600, 615
Ehrman, J. R., 590
Ekers, R. D., 401, 416,
417
Ekaspong, A. G., 447
Ellerman, F., 20
Ellison, M. A., 386
El-Nadi, L. M., 561
Elton, R. C., 288
Elwert, G., 318, 321, 457
Endt, P. M., 548, 560,
561
Epstein, E., 417, 423
Erickson, W. C., 214, 217,
218, 219, 224, 231, 232
Erne, F. C., 561
Escobar, I., 517, 519,
521
Evans, D. S., 123

Evans, J. W., 76, 237,
238
Evans, R. D., 490, 492, 493,
536
Evans, W. D., 314

F

Fabry, C., 140, 145
Fan, C. Y., 234, 352, 371,
373, 375, 376, 377, 390
Faulkner, J., 435, 436, 598,
615, 617, 618, 622, 623,
624
Fawcett, B. C., 287, 288,
290, 291
FAZIO, G. G., 481-524; 336,
487, 501, 503, 507, 508,
511, 515, 518, 519, 521
Feenberg, E., 496
Fehrenbach, C., 57, 146,
147
Feldman, U., 288
Fellgett, P., 160
Felten, J. E., 327, 336, 347,
489, 490, 496, 497, 501,
509
Fermi, E., 387
Fernbach, S., 499
Ferraro, V. C. A., 465
Fetisov, E. P., 318
Fibich, M., 396
FICHTEL, C. E., 351-98;
352, 359, 362, 363, 364,
366, 382, 383, 388, 521
Field, G. B., 139, 416, 434,
438, 445, 489, 629, 635
Finsen, W. S., 38
Firor, J., 223, 224, 247,
255, 370
Fisher, P. C., 334, 336,
518
Fletcher, J. M., 31
Fokker, A. D., 232
Follin, J. W., 639
Fomichev, V. V., 257
Forbush, S. E., 351
Ford, W. K., 408, 409
FOWLER, W. A., 525-70;
441, 442, 473, 500, 525,
526, 529, 532, 533, 535,
539, 540, 541, 542, 543,
552, 557, 559, 562, 563,
564, 565, 639, 640
Fraenkel, B. S., 288
Frank, L. A., 313,
380
Frazier, E. N., 67
Fredga, K., 308
Freier, P. S., 352, 362,
363
Friedman, H., 279, 286, 308,
310, 311, 315, 318, 325,
328, 330, 332, 333, 334,
336, 518, 520
Friedman, H. L., 332, 334
Friedmann, A. A., 627

- Frisch, U., 83
 Frost, A., 425
 Frost, K. J., 318, 512, 520
 Fruin, J. H., 516, 517, 521
 Frye, G. M., Jr., 506, 519, 521
 Fujimoto, K., 521
 Fujimoto, Y., 441, 487
 Fuligni, F., 336, 518
- G
- Gabriel, A. H., 287, 288, 290, 291
 Gallinaro, G., 638
 Gamow, G., 498, 538, 627, 635
 Gandoifi, A., 336, 518
 Gardner, F. F., 177, 187, 188, 189, 191, 192, 193, 195, 197, 198, 200, 207, 208, 417, 431
 Garmire, G., 332, 334, 336, 341, 346, 348, 486, 489, 490, 506, 507, 509, 510, 513, 519, 521
 Garrett, D. L., 281, 283, 293, 295
 Gascoigne, S. C., 118
 Gawin, J., 517, 519
 Geake, J. E., 140, 149, 155
 Gebbie, H. A., 140
 Gelfreich, G., 255
 Gent, H., 210, 425
 Georgelin, R., 147
 Geroch, R. P., 643
 Gershtein, S. S., 637
 Giacconi, R., 310, 325, 328, 332, 333, 334, 336, 341, 346, 348, 518
 Gibbons, J. H., 536, 547
 Giese, R. H., 216
 Gilbert, F., 474
 Gillett, F. C., 214, 217, 224, 231, 247, 249
 Gingerich, O., 295
 Ginzburg, V. L., 170, 231, 339, 345, 420, 434, 443, 444, 489, 490, 496, 502, 506, 507, 509, 510
 Given, L. P., 139
 Glaser, H., 262
 Glaudemans, P. W. M., 561
 Gloeckler, G., 352
 Godoli, G., 226
 Gold, F., 240
 Gold, T., 203, 276, 489
 GOLDBERG, L., 279-324; 248, 287, 296, 299, 300, 301, 303, 304, 383, 384
 Goldberg, M. D., 534, 535
 Goldreich, P., 457, 494, 538
 Goldsmith, D. W., 421
 Golnev, V. J., 258
 Good, W. M., 563
 Gopasyuk, S. I., 7
 Gorenstein, P., 332, 333, 334, 336, 341, 346, 348
 Goss, W. M., 139, 184, 186, 187, 188, 189, 190, 191, 192, 208
 Gottlieb, B., 241
 Gould, R. J., 327, 328, 338, 340, 347, 485, 489, 494, 502, 506, 507, 509, 510
 Govorov, A. M., 542
 Gower, J. F. R., 417
 Grader, R. J., 342, 343, 344
 Graff, R. D., 205
 Graner, G., 159
 Greeby, F. M., 25
 Greenberg, J. M., 169
 Greenstadt, E. W., 258
 Greenstein, G. S., 624
 Greenstein, J. L., 118, 157, 400, 406, 407, 408, 409, 410, 411, 412, 414, 427, 433, 623, 624, 641
 Greisen, K., 328, 506, 512, 637
 Greisen, K. I., 521
 Griffin, R. F., 401
 Griffin, W. G., 288
 Griffith, J. S., 466, 472, 602
 Griffiths, G. M., 534, 538, 541
 Griffy, T. A., 557, 563
 Gualdi, C., 411
 Gudden, F., 557
 Gundermann, E. J., 191, 233, 426
 Gunn, J. E., 436, 437, 489
 Guntzel-Lingner, U., 106
 Curevich, L. E., 643
 Gurney, R. W., 538
 Gursky, H., 325, 328, 332, 333, 334, 336, 341, 346, 348, 518
 Guss, D. E., 352, 359, 364, 366, 382, 383, 388
 Gutmann, F., 31
 Gutzeit, G., 63
- H
- Habing, H. J., 457
 Hablick, D., 457
 Haddock, F. T., 423, 425, 426
 Hafner, E. M., 336, 518, 521
 Hale, G. E., 1, 4, 20
 Hall, J. S., 187, 178
 Hall, L. A., 279, 284, 288, 290, 291, 296, 301, 318
 Hansen, R. T., 238, 239, 241, 242, 244, 263
 Hansen, S., 238, 239
 Hardebeck, H. E., 233, 426
 Harkness, R. L., 250
 Härn, R., 580, 591, 594, 617
 Haro, G., 403
 Harrington, J. P., 602
 Harris, D. E., 233, 426
 Harris, D. L., 98, 100
 Hartz, T. R., 222, 249, 250
 Harvey, J. W., 7, 229
 Hasegawa, H., 441, 487, 517, 519, 521
 Haslam, C. G. T., 170, 177
 Hata, S., 215, 230, 231
 Haurwitz, M. W., 386
 Hawking, S. W., 632, 640, 643
 Hayakawa, S., 336, 338, 344, 345, 486, 487, 502, 504, 507, 509, 510, 518
 Hayashi, C., 564, 571, 591, 594, 596, 609, 617, 622, 639
 Haymes, R. C., 337, 520
 Hazard, C., 399, 401, 425, 426
 Hazlehurst, J., 81
 Heard, J. F., 32, 92, 99
 Heavens, O. S., 161
 Hebbard, D. F., 542, 548, 549, 552
 Heckmann, O., 639, 641
 Heer, C. V., 172, 205
 Heere, K., 408, 409
 Heeschen, D. S., 427
 Heiles, C., 345
 Heintze, J. R. W., 69, 70, 295
 Helfer, H. L., 461
 Helmken, H., 336, 513, 519, 521
 Helmken, H. F., 515
 Henderson, G., 163
 Hendrix, D. O., 58
 Henry, J. C., 184, 189
 Henry, R. C., 629
 Hensley, D. C., 563
 Hepburn, N., 225, 247
 Herbig, G. H., 139
 Herman, R. C., 639
 Hernandez, G., 144
 Heroux, L., 284, 290, 301
 Herz, M., 572, 596
 Hewish, A., 217, 218, 232, 233, 425, 426
 Hibner, J., 517, 519
 Higbie, P., 336, 513, 519, 521
 Hill, E., 417, 431
 Hill, E. R., 489

AUTHOR INDEX

655

Hill, R. M., 144

Hill, R. W., 342, 343, 344

Hill, S. J., 408, 409

Hiltner, W. A., 408, 409

Hilton, W. B., 98

Hinteregger, H. E., 279, 284, 288, 290, 291, 296, 301, 318

Hirschberg, J. G., 162

Hitchcock, J. L., 139, 635

Hobbs, L. M., 159

Hodge, P. W., 598

Hoffleit, D., 420

Hofmann, D. J., 391

Hofmeister, E., 572, 582, 584, 606, 607

Högbom, J. A., 218, 258

Hogg, D. E., 425

Höglund, B., 191

Höiland, E., 475

Holden, D. J., 429

Holmberg, P., 561

Honsaker, J. L., 563

Hoory, S., 288

Hornby, J. M., 175

Höshl, R., 564, 571, 594, 596, 609, 617, 622

House, L. L., 288

Hovenier, J. W., 340

Howard, L. N., 475

HOWARD, R., 1-24; 4, 6, 7, 8, 9, 11, 12, 14, 15, 17, 19, 20, 236, 253, 386

Howard, R. F., 31, 33

Hoyle, F., 267, 268, 275, 384, 407, 411, 412, 413, 414, 415, 416, 417, 419, 420, 430, 432, 433, 434, 435, 439, 441, 445, 446, 500, 525, 526, 529, 532, 543, 557, 559, 564, 605, 633, 639, 640, 641, 642

Huang, S.-S., 39, 95

Hubenet, H., 69, 70, 295

Huch, W. F., 214, 216, 217, 224, 231, 247, 249

Hughes, D. J., 534, 535, 536, 545

Hughes, E., 146, 147

Hughes, M. P., 250

Hultqvist, B., 352

Humason, M. L., 403, 419

Humble, J., 550, 552

Hunter, C., 455, 456, 461

Hunter, J. H., 32, 33

Hurley, M., 471, 472

Hyde, G. M., 194, 195, 196, 197, 198

Hyder, C. L., 228, 244, 245, 254, 255

I

IBEN, I., JR., 571-626; 119, 120, 121, 123, 525, 572, 573, 575, 582, 584, 588, 590, 594, 595, 597, 598, 606, 607, 609, 610, 611, 613, 615, 617, 618, 622, 623, 624

Ielley, I. V., 636

Ingalls, R. P., 193, 195

Ingham, M. F., 214, 216, 218

Ingrao, H. C., 51

Inman, C. L., 595

Iriarte, B., 403

Irwin, J. B., 88

Ivanov-Kholodnyi, G. S., 296, 297, 298

J

Jacklyn, R. M., 170

Jacobson, A. S., 337, 342, 343, 344, 519, 520

Jacquinot, P., 139, 143, 144, 145, 147, 152, 161

James, J. C., 243, 244, 247

James, R. A., 471, 472

Jardetzky, W. S., 465, 468

Jarmie, N., 541, 542, 543, 546

Jarosch, H., 474

Jarrett, A. H., 249

Jaschek, C., 30, 33, 36

Jaschek, M., 30, 33, 36

Jeans, J. H., 37, 469, 470, 476

Jefferies, J. T., 248

Jeffers, H. M., 25

Jeffreys, W. H., 427

Jelley, J. V., 494, 516, 517, 521

Jenkins, F. A., 161

Jenkins, L. F., 124, 125

Johnson, H. L., 147, 611

Johnson, H. M., 336, 518

Johnston, I. D., 203

Jokipii, J., 436

Jones, B. B., 281, 288

Jones, F. C., 339

Jopson, R., 328, 342

Jordan, C., 287, 290, 291, 296, 297, 300

Jordan, W. C., 334, 336, 518

Jose, P. D., 31

Jugaku, J., 332, 334, 336, 341, 346

Julian, W. H., 456, 457

Jungner, H., 561

Juulman, C. O. L., 161

K

Kachalov, V. P., 281

Kadesch, R. R., 162

Kahalas, S. L., 83

Kahn, F. D., 457

Kakinuma, T., 223, 224, 247, 248, 255

Kalnajs, A. J., 459

Kamata, K., 517, 519, 521

Kamiya, Y., 521

Kannelaud, J., 205

Kaplan, L. D., 139

Kaplon, M. F., 336, 518, 521

Kardashev, N. S., 418, 443, 629

Karimov, M. G., 237

Karzas, W. J., 340

Kato, S., 68, 73, 78, 79

Kavanagh, R. W., 557

Kawabata, K., 248, 441

Kellermann, K. I., 422, 425, 426

Kellogg, P. J., 214, 216, 217, 224, 231, 247, 249

Kerr, F. J., 453

Khalatnikov, I. M., 643

Kholopov, B. N., 26

Kiepenheuer, K. O., 228, 231

Kimura, H., 623

Kindlmann, P. J., 163

King, I. R., 453

Kinman, T. D., 401, 402, 403, 407, 408, 409, 410, 416, 419, 420, 421, 422

Kippenhahn, R., 8, 253, 572, 579, 596, 606

Kirkwood, J. G., 81

Kiss, J., 90, 92

Kitamura, M., 88

Kleczek, J., 14, 225, 237, 253

Klein, O., 447

Kniffen, D. A., 521

Koch, L., 336, 518

Koch, R. H., 96

Kodaira, K., 294, 295

Koehler, J., 438

Köhler, H., 50, 51

Kolb, A. C., 288

Komberg, B. V., 418, 419

Kompaneets, A. S., 636, 642

Kondo, I., 521

Kopal, Z., 27, 39, 41, 99

Korchat, A. A., 322

Korol'kov, D., 255

Kraft, R. P., 30, 99, 345, 602, 605, 606, 607

Krat, V., 27

Kraushaar, W., 336, 486, 489, 506, 507, 509, 510, 513, 519, 521

- Kreplin, R. W., 315, 318
 Krimigis, S. M., 352, 365,
 367, 380, 381, 391, 392,
 393, 394, 395
 Kron, G. E., 118
 Krone, R. W., 561
 Krutov, V. V., 308
 Kuehner, J. A., 564
 Kuhl, L. V., 605
 Kuiper, G. P., 57
 Kukarkin, B. V., 26, 29,
 37
 Kulsrud, R. M., 236, 253
 Kundu, M. R., 223, 225, 231,
 247, 248, 321
 Kung, S.-M., 85
 Kunz, W. E., 563
 Kuperus, J., 561
 Kuperus, M., 76, 236, 248,
 249, 253, 255
 Kurochkin, N. E., 29,
 37
 Kurt, V. G., 629
 Kuzmin, V. A., 637
- L
- Lake, C. W., 152
 Lal, M., 534, 538
 Lamb, H., 78
 Lamlä, E., 401, 416, 419,
 420, 422
 Lamport, J. E., 234, 352,
 371, 373, 375, 376, 377,
 390
 Landini, M., 314, 315
 Lane, A. M., 550, 552, 553,
 555
 Lange, I., 351
 Langer, E., 572, 596
 La Pointe, M., 517, 519,
 521
 Larsen, R. B., 121, 123
 Larson, J. D., 549
 Latter, R., 340
 Lauritsen, C. C., 557
 Lauritsen, T., 534, 545, 546,
 547, 548, 557, 559, 560,
 561
 Layzer, D., 443, 630
 Lebedinskii, A. I., 643
 LEBOVITZ, N. R., 465-80;
 453, 467, 472, 473, 474,
 475, 476, 477, 478
 Ledoux, P., 20, 473, 474,
 475, 477
 Lee, L. L., Jr., 561
 Lee, R. H., 2, 250
 Leehouts, H. P., 561
 Lehman, R. C., 250
 Leighton, R. B., 3, 6, 9, 12,
 57, 67, 70, 74, 76, 78, 79,
 228, 231, 258, 236
 Leinbach, H., 352
 Lejeune Dirichlet, P. G.,
 467
 LeRoux, E., 425
- LeSqueren-Malinge, A. M.,
 231
 Lichtenstein, L., 466
 Lide, D. R., 184
 Lieber, M., 507, 509
 Lifshitz, E. M., 643, 646
 Lighthill, M. J., 68, 71,
 73
 Liller, W. C., 61, 140,
 160
 Lilliequist, C. G., 238, 243,
 244, 249, 250
 LIN, C. C., 453-64; 454,
 456, 457, 459, 460, 461
 Lin, P. R., 352, 365
 Lindblad, B., 456, 458
 Lindblad, P. O., 456,
 458
 Lindsay, J. C., 310, 318
 Lindsay, R. B., 71
 Linfolt, E. H., 46, 48
 Lippincott, S. L., 116
 Litvak, M. M., 202, 203, 204,
 205
 Liu, C. K., 214, 215, 242,
 244, 246, 249, 252
 Livingstone, W. L., 408
 Loebenstein, H. M., 559
 Long, C. O., 516, 517,
 521
 Long, R. J., 425
 Longair, M. S., 401, 428,
 432, 630
 Loughhead, R. E., 1
 Low, F. E., 417
 Ludwig, G. H., 171
 Lum, W. T., 191
 Lüst, R., 231, 240, 242, 244,
 245
 Luyten, W., 403, 404, 408,
 409
 Luyten, W. J., 333, 403,
 427
 Lynden-Bell, D., 456, 457,
 469, 471, 478
 Lynds, C. R., 402, 407, 408,
 409, 410, 412, 413, 414,
 415, 416, 418, 419
 Lyot, B., 237
 Lyttleton, R. A., 468, 469,
 478
- M
- McAdam, W. B., 417,
 431
 McChesney, M., 71
 McClain, E. F., 177
 McCracken, K. G., 234, 258,
 352, 359, 370, 371, 372,
 373, 376, 390
 McCreia, W. H., 287, 273,
 418, 445
 MCDONALD, F. B., 351-98;
 171, 332, 334, 352, 359,
 360, 366, 368, 369, 373,
 375, 376, 377, 378, 379,
 391, 396
 MCGEE, R. X., 183-212;
 187, 189, 191, 192, 193,
 195, 197, 198, 200, 207,
 208
 McIlwain, C. E., 352
 Mack, J. E., 145, 159
 McKellar, A., 635
 McKenzie, D., 318
 Mackey, M. B., 399, 401,
 417, 425, 426, 431
 McKibbin, D. D., 240,
 251
 Macklin, R. L., 536, 547
 McNally, D., 183
 McNamara, D. H., 96,
 103
 McNeill, D. A., 63
 McNutt, D. P., 145, 159
 Macris, C. J., 9
 McVittie, G. C., 490
 McWhorter, A. L., 202, 203,
 204, 205
 Maedler, J. A., 105
 Maehlum, B., 313
 Magurno, B. A., 534, 535,
 545
 Mahaux, C. M., 535, 552
 Majumdar, S., 161
 Makino, T., 521
 Maksutov, D. D., 48
 Malacara, D., 48
 Malitson, H. H., 213, 224,
 354
 Maltby, P., 177, 442, 444
 Malville, J. M., 249, 250,
 255
 Malyavkin, L. P., 308
 Mammano, A., 29
 Manchester, W., 565
 Mandel'shtam, S. L., 248,
 279, 308, 314, 315, 318,
 320
 Manley, O., 341, 345,
 348
 Mannino, G., 29
 Manson, J. E., 284, 285,
 286, 292, 293
 Mapp, E. T., 63
 Margoni, R., 29
 Mark, H., 328, 342
 Markham, J. J., 71
 Martynov, D. Ya., 96
 Martynov, V. K., 638
 Martz, D. E., 57
 Mason, R. H., 240, 251
 Mathewson, D. S., 172, 175,
 223, 224, 247, 255
 Matsuoka, M., 336, 338, 344,
 345, 518
 Matsushima, S., 294
 Matthews, T. A., 400, 401,
 406, 408, 416, 417, 420,
 425, 444
 Maxwell, A., 223, 224,
 257
 Mayall, N. U., 419

AUTHOR INDEX

657

Maze, R., 517, 519
 Meeks, M. L., 184, 186,
 189, 192, 193, 194, 195,
 196, 197, 198, 200, 202,
 203, 204, 205
 Mein, P., 70, 74, 75
 Meinel, A. B., 51
 Menon, K., 192
 Menzies, A., 123
 Merrill, P. W., 287
 Mertz, L., 140, 143
 Mestel, L., 466, 467,
 594
 Metzger, A. E., 336, 482,
 517
 Metzger, F. R., 559
 Meyer, F., 244, 246
 Meyer, P., 351, 365, 390,
 448
 Meyerott, A. J., 334, 336,
 518
 Meyer-Schützmeister, L.,
 561
 Mezger, P. G., 191, 195,
 198, 200
 Michard, R., 74, 75, 76,
 225, 238, 250
 Migulin, V. V., 638
 Miley, G. K., 425, 426
 Milford, S. N., 487, 506,
 507, 509
 Miller, W. C., 428
 Mills, B. Y., 417, 431
 Milne, D. K., 172, 175,
 417
 Milne, E. A., 543
 Mingay, D. W., 559
 Mitchell, G. F., 432
 Moak, C. D., 563
 Moffet, A. T., 422, 425, 429,
 444
 Monaghan, J. J., 472
 Montgomery, M. D., 314
 Moore, D. W., 68, 73,
 78
 Moore, J. H., 25, 89
 Moore, R., 139
 Moore-Sitterly, C. E., 287
 Moran, J. M., 194, 195, 196,
 197, 198
 Moretti, E., 336, 518
 Morgan, W. W., 30, 33
 Mori, S., 521
 Morimoto, M., 224
 Moriyama, F., 296
 Morpurgo, G., 638
 Morris, S. C., 39
 MORRISON, P., 325-50; 336,
 345, 494, 496, 506, 507,
 509, 510, 534, 536, 636
 Morrow, R. A., 541
 Mozzer, F. S., 546, 547
 Mugridge, E. G. V., 163
 Muller, C. A., 172
 Müller, E. A., 299, 303, 304,
 383, 384
 Müller, H., 223, 225

Müller, H. H., 556
 Müller, J. R., 152
 Müller, R., 239
 Münch, G., 139, 155, 157,
 623, 624
 Muney, W. S., 310, 311
 Murakami, K., 517, 519,
 521
 Murayama, T., 521
 Mustel, E. R., 17, 220, 261,
 262, 263
 Myers, G. W., 88

N

Narlikar, J. V., 441,
 445
 Narlikar, S., 633
 Ne'eman, Y., 445
 Nelms, A. T., 492
 Neas, N. F., 15, 17, 214,
 219, 234, 236, 237, 245,
 258, 262, 263, 372, 377,
 380, 389
 Nesterova, N. M., 516, 520,
 521
 Neubauer, F. J., 25
 Neugebauer, G., 57
 Neugebauer, M., 214, 216,
 219, 233, 233, 235, 244,
 245, 251, 261, 263
 Neupert, W. M., 290, 311,
 313
 Neville, A., 432
 Newing, R. A., 473, 474,
 478
 NEWKIRK, G. A., JR., 213-
 66; 214, 215, 223, 224, 231,
 237, 241, 242, 244, 247,
 248, 263
 Newton, I., 525
 Ney, E. P., 214, 216, 217,
 224, 231, 247, 249, 352,
 365, 388
 Neylan, A. A., 224
 Nicholson, W., 401, 425
 Nikishov, A. I., 494,
 636
 Nikol'skii, G. M., 296, 297,
 298, 345
 Noble, L. M., 242, 244, 246,
 249, 251, 252
 Noerdlinger, P., 423,
 436
 Norman, G. E., 295
 Norman, K., 315, 316,
 321
 Novick, R., 337
 NOVIKOV, I. D., 627-48;
 445, 446, 627, 631, 633,
 635, 636, 641, 643,
 645
 Nower, T. M., 561
 Noxon, J. F.,
 238
 Noyes, R. W., 6, 70, 76,
 78, 79

O

Oda, M., 332, 333, 334, 336,
 341, 345, 346, 348, 506
 O'Gallagher, J. J., 352,
 380
 Ogawara, Y., 345
 Ögelman, H. B., 521
 Ogilvie, K. W., 359,
 364
 Ohyama, N., 82
 Oke, J. B., 157, 406, 407,
 416, 417, 418, 419, 422
 Okuda, H., 486, 502, 504,
 507, 509, 510, 521
 Okun, L. B., 446, 638
 Oliver, J. P., 423
 Olness, J. W., 563
 Ono, Y., 81, 82, 591
 Oort, J. H., 453, 454,
 458
 Öpik, E., 275, 276
 Orrall, F. Q., 248
 Osaki, Y., 622
 Osawa, K., 332, 334, 336,
 341, 346
 Osetinskii, G. M., 542
 Osmer, P., 332, 334, 336,
 341, 346
 Osmer, P. S., 32
 Oster, L., 70, 247
 Osterbrock, D. E., 71, 76,
 81, 83, 407, 412, 413, 415
 Ostic, R. G., 267
 Ostriker, J. P., 456, 471,
 478
 Overbeck, J., 328
 Ozernoy, L. M., 420, 434,
 443, 444, 643

P

Pachner, J., 643
 Pacholczyk, A. G., 417
 Pacini, F., 446
 Pagel, B. E. J., 279
 Palmer, H. P., 425
 Palmer, P., 192, 193, 194,
 200, 206
 Paolini, F., 325, 328,
 518
 Parenago, P. P., 26
 Parijskij, Y. N., 258
 Parker, E. N., 6, 179, 218,
 236, 241, 242, 246, 251,
 252, 259, 262, 351, 371,
 386, 389, 390, 391, 396
 Parker, P. D., 525, 541,
 543, 546, 562
 Parker, R. A. R., 412, 413,
 415
 Parkinson, W. H., 287, 295,
 296
 Partridge, R. B., 642,
 645
 Patterson, J. P., 564
 Pauliny-Toth, I. K., 422

- Pawsey, J. L., 223, 224, 247, 255
 Peach, G., 295
 Peacock, N. J., 288
 Pearce, W. P., 590
 Pecker, J.-C., 262
 Peebles, P. J. E., 627, 635, 637, 639, 643
 Pekeris, C., 474
 Pelling, R. M., 318, 337, 343, 520, 521
 Penfield, H., 206
 Penrose, R., 643
 Penston, M. V., 422
 Penzias, A. A., 189, 627, 635
 Perek, L., 453, 454
 Perkins, F., 203
 Peterson, B. A., 409, 410, 436, 437, 489
 Peterson, L. E., 318, 335, 336, 337, 342, 343, 344, 513, 518, 519, 520, 521
 Petrie, R. M., 26, 30, 32, 34, 36, 37, 39, 88, 98
 Phelps, F. M., III, 162
 Piatelli, M., 314, 315
 Pickering, E. C., 88
 Piddington, J. H., 7, 443, 444, 632
 Pierce, A. K., 56
 Pikelner, S. B., 446, 632, 638
 Pilkington, J. D. H., 417
 Puxley, R. E., 556
 Plaskett, J. S., 98
 Plaut, L., 332
 Plavec, M., 27
 Pneuman, G. W., 240, 246, 259, 260, 263
 Poincaré, H., 466, 475, 477
 Pollack, J. B., 487, 501, 503, 507, 508
 POPPER, D. M., 85-104; 89, 90, 92, 94, 95, 96, 97, 99
 Porter, J. R., 287, 296
 Porter, N. A., 516, 517, 521
 Pottasch, S. R., 247, 248, 249, 253, 279, 291, 296, 297, 298, 299, 300, 301, 302, 383
 Pounds, K. A., 287, 310, 314, 315, 316, 320, 321
 Prendergast, K. H., 461
 Price, R. M., 417
 Primakoff, H., 496
 Pronik, V. I., 412
 Prosser, F. W., Jr., 561
 Puppi, G., 169
 Purcell, J. D., 281, 283, 284, 290, 291, 293, 295, 296, 306, 308, 318
- Q
- Quigley, M. J. S., 170, 177
- R
- Rabe, W., 106
 Radford, H. E., 184, 206
 Radhakrishnan, V., 189, 191, 194, 195, 209
 Ramsey, J. V., 3, 148, 149, 162, 163
 Randers, G., 467
 Rao, U. R., 234, 352, 371, 376, 390
 Rayleigh, Lord, 475
 Read, R. B., 194, 195, 399
 Reddish, V. C., 425
 Rees, M. J., 424, 432, 433, 434, 435, 437
 Reeves, E. M., 287, 295, 296
 Reeves, H., 525, 527
 Rehm, R. G., 456, 457
 Reid, G. C., 352, 396
 Reidy, W. P., 310
 Reines, F., 521
 Renson, P., 20
 Ribner, H. S., 68
 Rich, J. C., 295, 296
 Ridgely, A., 281, 283
 Riegler, G., 332, 334
 Riemann, B., 467, 468
 Righini, G., 314, 315
 Riley, P. J., 541
 Ring, J., 140, 149, 150, 155, 162
 Rishkov, N., 255
 Roberts, A. W., 88
 Roberts, J. A., 257
 Roberts, M. S., 208
 Roberts, P. H., 471, 472, 476, 602
 Roberts, W. O., 17, 262
 ROBINSON, B. J., 183-212; 183, 187, 188, 189, 192, 193, 195, 197, 198, 200, 206, 207, 208
 Robinson, B. K., 438
 Rocchia, R., 336, 518
 Roddier, F., 67
 Rodgers, A. W., 623
 Roeder, R. C., 432
 Roelof, E. C., 396
 Roessler, F. L., 145, 159, 161
 Roethig, D. T., 334
 Rogers, A. E. E., 184, 186, 187, 188, 189, 190, 192, 193, 194, 195, 196, 197, 198, 200, 206
 Roll, P. E., 627, 635
 Roll, P. G., 635
 Roman, N. G., 30, 33, 97
- Romand, J., 146, 147
 Ronson, B., 425
 Rose, W. K., 177
 Rosefeld, L., 550, 552
 Rosen, G., 642
 Rosen, S., 487
 Rosenberg, F. D., 408, 421
 Rosenkilde, K., 476, 478
 Rosin, S., 50, 51
 Ross, F. E., 50
 Rosseland, S., 473
 Rossi, B., 325, 326, 328, 329, 334, 498, 518
 Rossner, L., 476
 Rothe, E. D., 318, 512, 520
 Rothenflug, R., 518, 336
 Rothwell, P., 352
 Rougoor, G. W., 194, 195, 208
 Rowson, B., 210
 Roxburgh, I. W., 39, 442, 465, 466, 467, 472, 602, 604
 Roy, A. E., 602
 Rubin, V. C., 408, 409
 Ruderman, M., 595
 Russell, H. N., 88
 Russell, P. C., 310
 Russo, D., 314, 315
 Rust, D. M., 2, 8, 253
 Ryle, M., 401, 416, 431, 432
- S
- Sacharov, A. D., 633
 Sahade, J., 27, 30, 90, 95, 98
 Saito, K., 215, 223, 225, 226, 227, 228, 230, 231, 236, 243, 244, 247, 253, 254
 Saito, M., 82
 Saito, T., 17
 Sakakibara, S., 521
 Sakashita, S., 81, 82, 591
 Saksena, G. D., 162
 Salandin, G., 521
 Salatskii, V. I., 542
 Salpeter, E. E., 183, 202, 203, 233, 325, 347, 409, 426, 437, 438, 488, 498, 525, 564, 629
 Sandage, A. R., 115, 121, 333, 334, 336, 341, 346, 399, 400, 401, 402, 403, 404, 407, 408, 409, 410, 416, 417, 418, 419, 420, 421, 422, 428, 430, 439, 459, 597, 611, 613, 615, 621, 630
 Sanford, P. W., 315, 316, 321
 Sargent, A., 436
 Sargent, L. W., 641

- Sargent, W. L. W., 417,
420, 433, 602, 623, 632
Sartori, L., 345
Saslaw, W. C., 432, 441,
446, 453, 594, 617
Saunders, P. A. H., 287,
290, 291
Savodoff, M. P., 510
Sawyer, G. A., 288
Sawyer, H. B., 99
Scarfi, F. L., 242, 244, 246,
249, 251, 252
Scarfe, C. D., 26, 39, 534,
538
Scearce, C. S., 214, 219,
234, 237, 258, 389
Schardt, A. W., 543
Schatten, K. H., 262
SCHATZMAN, E., 67-84; 68,
80, 81, 385, 506
Scheepmaker, A., 336
Scheuer, P. A. G., 402, 410,
431, 437
Schiffer, J. P., 638
Schild, R. E., 408, 409,
805
Schlesinger, F., 88
Schlüter, A., 8, 240, 253
Schmidt, B., 46
Schmidt, H., 244, 246
Schmidt, M., 225, 300, 400,
401, 403, 406, 407, 408,
409, 410, 411, 412, 414,
422, 425, 427, 430, 433,
436, 437, 453, 455
Schmidt, O. J., 270, 271
Schmidt-Kaler, Th., 605
Schmidtke, G., 279,
288
Schönberg, M., 576, 592
Schorn, R. A., 139, 423
Schreder, G., 328, 494
Schröter, E. H., 3, 4
Schücking, E., 639, 641
Schulte, D. H., 49
Schwartz, D. A., 318,
521
Schwartz, R. B., 534, 535,
536, 545
Schwarzschild, K., 48
Schwarzschild, M., 80, 571,
580, 591, 594, 597, 617
Schweizer, W., 284, 290, 291,
296, 301, 318
Schwider, J., 159
Sciama, D. W., 432, 433,
434, 437
Scott, P. F., 233, 417, 425,
426, 431
Seagrave, J. D., 541, 542,
543, 546, 548, 552
Seares, F. H., 20
Searle, L., 623, 641
Sears, R. L., 563, 571,
596
Seaton, M. J., 247, 297,
300
Sedov, L. I., 81
Seeger, C. L., 172
Seeger, P. A., 557
Seek, J. B., 214, 219, 234,
237, 258, 389
Segré, E., 490
Seielstad, G. A., 177
Sekido, Y., 521
Selby, M. J., 150, 162
Serber, R., 499
Serkowski, K., 169
Serlemitsos, P., 332,
334
Servajean, R., 74, 75, 238
Setti, G., 169, 436
Severny, A. B., 1, 2, 6, 7,
19, 226, 253
Seward, F., 328, 342
Seward, F. D., 342, 343,
344
Shah, G., 169
Shakeshaft, J. R., 172, 417,
431, 635
Shapley, A. H., 17
Shapley, M. B., 39
Share, G., 518
Sharov, A. S., 420
Sharp, L. E., 233, 426
Sharpless, S., 179, 453
Shaviv, G., 563
Shaw, P. B., 527
Sheeley, N. R., Jr., 3, 4,
19, 229
Shen, S. P., 506
Shenton, D. B., 281
Shepherd, G. G., 152,
159
Sheppard, D. M., 549
Sheridan, K. V., 224, 232
Shibata, S., 517, 519, 521
Shimmins, A. J., 399, 401,
416, 417, 425, 426
Shklovsky, I. S., 202, 247,
321, 345, 412, 413, 414,
415, 417, 420, 424, 437,
439, 454
Sholomitsky, G. B., 422,
629
Shu, F. H., 454, 456, 457,
459, 460, 461
Silva, R. W., 240, 251
Simoda, M., 623
Simon, G. W., 6, 79,
236
Simon, P., 223, 224, 247,
255
Simpson, J. A., 17, 234,
351, 352, 371, 375, 376,
377, 380, 390
Sinanoglu, O., 287
Singer, S., 314
Sironi, G., 171
Sizov, I. V., 542
Sjunjaev, R. A., 629, 641
Skalafuris, A., 67
Skutnik, B., 287
Slater, P. N., 163
Slee, O. B., 217, 230, 231,
233, 234, 417, 425, 431
Slettebak, A., 31, 33
Slevogt, H., 48
Sliah, V. I., 425
Sloanaker, R. M., 177
Smak, J., 98
Smart, R. N., 148, 162
Smerdt, S. F., 223, 224, 247,
255
Smirnov, Yu. N., 639
Smith, D. R., 234, 352, 371,
373, 375, 376, 377, 390
Smith, E. J., 245
Smith, H., 425, 426
Smith, H. J., 139, 420
Smith, J. A., 427
Smith, L. H., 506, 521
Smith, L. L., 615, 621
Smith, S. F., 15, 20
Smulders, P. J. M., 549,
561
Snowden, M. S., 32
Snyder, C. W., 214, 216,
219, 233, 235, 244, 245,
251, 261, 263
Sobieski, S., 96
Soboleva, N. S., 255, 258
Sodnom, N., 542
Sofia, S., 247
Solomon, P. M., 416, 438,
489
Sonett, C. P., 245
Sorokin, P. V., 561
SOUFFRIN, P., 67-84; 70,
73, 76
Spada, G., 333, 348
Spear, R. H., 549
Spiegel, M. S., 507, 509
Spiegel, E. A., 68, 69, 70,
73, 78
Spinrad, H., 139
Spitzer, L., 441, 453
Spring, E., 561
Sreekantan, B. V., 332, 333,
334, 336, 341, 346, 348
Stainer, H. M., 257
Staub, H. H., 534, 541,
556
Stebbins, J., 88
Stecker, F. W., 502, 507
Stefensen, G., 598
Stehn, J. R., 534, 535
Stein, R. F., 68
Stein, W., 214, 216, 217, 224,
231, 247, 249, 417, 420,
434
Stein, W. A., 214, 217, 347,
365, 388
Steljes, J. F., 359, 373
Stenflo, J. O., 4
Stepanov, V. E., 2, 6, 7
Stephens, W. E., 534, 541
Stephenson, G. J., Jr.,
559
Stevens, C. M.,
838

- Stevens, M. W., 241, 245
 Stewart, J., 328, 482, 519, 521
 Stewartson, K., 476
 Stockhausen, R., 291
 Stockton, A. N., 407, 408, 409, 414
 Stoeckly, R., 471
 Stogsdill, E. E., 314
 Stoner, J. O., 144, 159
 Stothers, R., 445, 591, 609
 Stoy, R. H., 123
 Strand, K. A., 56, 96, 100, 105, 124
 Strehl, P., 557
 Strittmatter, P. A., 418, 419, 422, 435, 436, 602
 Stroke, G. W., 139
 Strom, K. M., 614, 615
 Strom, S. E., 614, 615
 Strömgren, B., 46, 103
 Struve, O., 26, 40, 85, 95, 98, 272
 Sturrock, P. A., 257, 443
 Suemoto, Z., 296
 Suess, H. E., 267, 384
 Suga, K., 517, 519, 521
 Sugimoto, D., 564, 571, 594, 596, 609, 617, 622
 Sullivan, W., 268
 Sutton, J., 425
 Swaneburg, B. N., 336
 Swann, C. P., 559
 Swarup, G., 224, 248, 255
 Swedin, M., 347
 Sweet, P. A., 389, 466, 467, 472, 602
 Swift, C., 328, 342
 Symms, L. S. T., 124
 Symonds, J. L., 202
 Syrovatskii, S. I., 170, 339, 345, 489, 490, 496, 502, 506, 507, 509, 510
- T
- Tagliaferri, G. L., 314, 315
 Tait, P. G., 476
 Takakura, T., 255, 256, 257, 259
 Taketani, M., 441, 487
 Talbot, R., 609
 Tanaka, Y., 170, 171, 336, 486, 502, 504, 507, 509, 510
 Tanner, N., 543
 Tassoul, J.-L., 466
 Taub, A. H., 639
 Taylor, T. B., 499
 TER HAAR, D., 267-78; 267, 268, 269, 271, 276
 Terrell, J., 411, 423, 433, 435
- Theissing, H., 46
 Thomas, H. C., 572, 579, 596
 Thomas, L., 315
 Thomas, R. G., 550, 552, 553, 555
 Thompson, A. R., 224, 247
 Thomson, W., 476
 Thorne, K. S., 632, 640, 642
 Tidman, D. A., 257
 Tilford, S. G., 287, 296
 Tinbergen, J., 172
 Tindo, I. P., 314
 Title, A. M., 3
 Tlamicha, A., 257
 Toomre, A., 454, 456, 457, 459
 Toor, A., 342, 343, 344
 Tousey, R., 279, 281, 283, 284, 287, 288, 290, 291, 293, 294, 295, 296, 306, 308, 318
 Townes, C. H., 454
 Toyoda, Y., 517, 519, 521
 Traub, W., 161
 Trellis, M., 238, 239
 Truran, J. W., 624
 Tsap, T. T., 7
 Tucker, W., 340, 345
 Turner, B. E., 184, 203
 Twiss, R. Q., 140
 Tyler, R. J., 632, 640, 641
- U
- Uchida, Y., 80
 Ueno, H., 521
 Underwood, J. H., 310, 311
 Unno, W., 68, 70
 Unruh, W. P., 561
 Unzicker, A. E., 286, 308, 310, 311, 318
 Urey, H. C., 267, 384
- V
- Vainstein, L. A., 295, 538
 van Albada, B. B., 106
 van Albada, T. S., 30, 37
 Van Allen, J. A., 313, 352, 365, 367, 380, 381, 392, 393, 394
 van Bueren, H. G., 124
 van Damme, K. J., 187, 188, 189
 VAN DE HULST, H. C., 167-82; 215, 216, 223, 227, 230, 231, 236, 242
 van den Bergh, S., 403
- van den Bos, W. H., 25, 105, 106, 107, 110, 111
 Van der Leun, C., 548, 549, 560, 561
 Vandervoort, P. O., 455
 Van Dilla, M. A., 336, 482, 517
 van Maanen, A., 20
 VAUGHAN, A. H., JR., 139-66; 150, 155
 Venables, F. H., 315
 Venkatesan, D., 380
 Véron, P., 401, 416, 421, 425, 431, 433
 Verschuur, G. L., 171, 193
 Villere, G., 402
 Viser, H. C. D., 457
 Vitkevitch, V. V., 217, 233
 Vlasov, V. I., 233
 Vogel, H. C., 88
 Vogl, J. L., 533, 540, 542, 548, 552, 562
 Vogt, R., 365
 Voltterra, V., 465
 von Hoerner, S., 425
 von Klüber, H., 19, 249
 von Weizsäcker, C. F., 268, 269
 Vyssotsky, A. N., 124
- W
- Waddington, C. J., 366, 383, 388, 488
 Wagoner, R. V., 441, 525, 526, 532, 639, 640
 Waldmeier, M., 19, 223, 225, 231, 237, 238, 239, 248
 Walker, M. F., 615, 621
 Wallerstein, G., 596
 Walmsley, M., 435
 Walraven, T., 473
 Walton, R. B., 548
 Wampler, E. J., 407, 416, 421, 438, 489
 Wang, C. P., 519
 Warburton, E. K., 563
 Warren, J. B., 541
 Warwick, C., 386
 Warwick, J. W., 222, 223, 249, 250, 254, 255
 Waters, J. R., 333, 334, 348
 Waters, T., 332, 334, 336, 341, 346
 Wattenburg, A., 499
 Wavre, R., 465, 466
 Wayman, P. A., 48, 124
 Wdowczyk, J., 517, 519
 Weaver, H. F., 183, 184, 189, 191, 192, 193, 199
 Webber, W. R., 354, 358, 362, 363
 Weekes, T. C., 506, 516, 517, 521

AUTHOR INDEX

661

- Wehlau, W. H., 85
 Weigert, A., 572, 579, 580, 596, 606, 609
 Weinberg, J. L., 216
 Weiner-Chasman, R., 534, 535
 Weinman, J. A., 561
 Weinreb, S., 184, 186, 189, 193, 200
 Weiss, A. A., 223, 232, 257
 Weisskopf, V. F., 483, 529
 Wentzel, D. G., 179, 386, 388, 453, 455
 Wernitz, C. W., 541, 562
 West, F. R., 85
 Westerhout, G., 172, 453
 Westphal, J. A., 422
 Weymann, R., 76, 605, 636
 Whang, Y. C., 214, 215, 242, 244, 246, 249, 252
 Wheeler, J. A., 633
 Whipple, F. L., 267, 275, 277
 White, G. R., 492
 White, H. S., 118
 White, R. H., 81, 440
 White, W. A., 314, 321
 Whiteoak, J. B., 177, 194, 195
 Whitham, G. B., 82
 Whitney, C. A., 67, 68, 69
 Widing, K. G., 248, 281, 283, 284, 287, 288, 290, 291, 293, 294, 296, 297, 300, 306, 318
 Wielebinsky, R., 172
 Wilcock, W. L., 149, 155
 Wilcox, J. M., 15, 17, 234, 236, 258, 262, 263, 377, 380
 Wild, J. P., 223, 224, 257
 Wildenthal, B. H., 561
 Willey, R. L., 609, 610
 Wilkinson, D. T., 627, 635, 642, 645
 Williams, D. R. W., 183, 189, 191, 192, 193, 199
 Williams, E. T. R., 124
 Williams, I. P., 423
 Williams, K. M., 315
 Williams, P. J. S., 425, 434
 Willmore, A. P., 315, 316, 321
 Wills, D., 233, 402, 410, 417, 425, 426
 Wilson, O. C., 36, 86, 240
 Wilson, R., 281, 283, 288, 308, 310
 Wilson, R. W., 189, 191, 627, 635
 Winckler, J. R., 352, 391, 519
 Winkler, H., 556, 564
 Winkler, H. C., 542, 559, 563
 Wirtanen, C. A., 401, 416, 419, 420, 422
 Wisniewski, W. Z., 417
 Wierick, G., 215
 Wolf, R. A., 347, 526, 532, 562
 Wolfe, J. H., 240, 251
 Woltjer, L., 169, 179, 345, 416, 435, 436, 442, 453, 457
 Woo, C., 595
 Wood, F. B., 37, 89, 96
 Woolf, N. J., 140, 149, 155, 347
 Woolley, R., 453
 Worley, C. E., 25, 37, 96, 100
 Wright, J. P., 507
 Wrubel, M. H., 602
 Wyndham, J. D., 232, 233, 401, 402, 416, 421
 Wyndham, J. E., 226, 233
 Wynne, C. G., 50, 51
 Wyse, A. B., 95
- Y
- Yabushita, S., 38
 Yakovieva, A. V., 281
 Yamamoto, Y., 486, 502, 504, 507, 509, 510
 Yamasaki, H., 81
 Yamashita, K., 336, 338, 344, 518
 Yandagni, N. K., 447
 Yesipov, V. F., 408, 421, 424
 Youn, Li Ha, 542
- Z
- Zaidins, C. S., 559, 564
 Zapolsky, H. S., 436
 Zatsepin, G. T., 637
 Zatsepin, V. I., 516, 520, 521
 Zawadzki, A., 517, 519
 Zebergs, V., 95, 98
 Zehnpfennig, T., 310
 Zeiger, H. J., 202, 203, 204, 205
 ZELDOVIC, YA. B., 627-48; 446, 627, 629, 631, 633, 636, 637, 638, 639, 641, 642, 643, 645
 Zelmanov, A. L., 642
 Zhelezniakov, V. V., 231, 248, 255, 321
 Zhitnik, I. A., 308
 ZIMMERMAN, B. A., 525-70; 535, 542
 Zirin, H., 2, 155, 247, 253, 290, 292, 296
 Zirkind, R., 57
 Zuckerman, B., 192, 193, 194, 200, 206
 Zurmühle, R. W., 534, 541
 Zwicky, F., 403

SUBJECT INDEX

- A
- Aberration
chromatic, 45, 47, 48, 51,
53, 56
- Absolute energy distribution
quasars, 417
- Absolute frequency
of binary stars, 30
- Absolute luminosity
of binary stars, 42
- Absolute magnitude
errors
in binary stars, 87
- Absolute parallaxes, 125
- Absorptance
of etalon, 141
- Absorption coefficient
continuous, 293
gamma-ray, 491
- Absorption cross section,
295
- Absorption edges, 295
- Absorption lines
solar, 2, 5, 67
spectrophotometry of, 153-
60
- Absorption losses, 145,
161
- Absorption of sound
in fluids, 71
- Abundances
coronal, 213
cosmic, 488, 489, 498
galactic, 326
nuclear, 537
Population I, 412
solar, 354, 362
see also Solar system;
Solar XUV
- stellar, 139, 582
- Acceleration mechanisms
in quasi-stellar objects,
443, 446
in the Sun, 387-89
in X-ray sources, 345
- Acceleration parameter
cosmological, 630,
634
- Acceleration-storage region,
380
- Accelerator experiments
and cosmology, 628,
638
meson and hyperon decay,
503
- Acceptance cone
Compton telescope,
513
- Accretion processes
in quasi-stellar sources,
446
in the solar nebula, 271,
274, 278
- Achromitization, 45, 46
and quasar observations,
443
- A-cloud
solar nebula, 272
- Acoustic fields, 68
- Acoustic leakage, 80
- Acoustic waves
in stellar atmospheres,
71
- Activity
solar
coronal observations, 221,
223, 224, 227, 247, 248
magnetic, 1, 8
see also Plage areas; Sun-
spot cycle
- Adiabatic oscillation
in rotating fluid, 472, 473,
474
- Adiabatic perturbations
cosmological, 644
- Adiabatic relation
hydrodynamic
in stellar atmospheres,
59
- ADP plate, 149
- ADS 450 AB, 111, 112
- ADS 1598, 129
- ADS 1630, 125
- ADS 1709, 129
- ADS 1729, 131, 132, 133
- ADS 1865, 131, 132, 133
- ADS 2799, 130
- ADS 3017, 129
- ADS 3098, 107, 126
- ADS 3135, 129
- ADS 3159, 114, 130
- ADS 3169, 129
- ADS 3210, 129
- ADS 3248, 129
- ADS 3475, 129
- ADS 3730, 129
- ADS 3841, 119
- ADS 4265, 130
- ADS 4617, 129
- ADS 5423, 129
- ADS 6314, 111
- ADS 6554, 131, 132,
133
- ADS 6650, 130
- ADS 6664, 131, 132, 134
- ADS 6811, 130
- ADS 7114, 119, 131, 134
- ADS 7284, 116, 131
- ADS 7545, 109, 127
- ADS 7744, 106
- ADS 7846, 108, 127
- ADS 8048, 110, 131, 132,
134
- ADS 8166, 119, 131
- ADS 8635, 131, 132
- ADS 8680, 131, 132
- ADS 8739, 129
- ADS 8891, 129
- ADS 8901, 131, 132, 135
- ADS 9031, 116, 131
- ADS 9094, 129
- ADS 9185 AB, 110, 128
- ADS 9186, 107, 126
- ADS 9247, 130
- ADS 9301, 130
- ADS 9352, 131, 132, 135
- ADS 9397, 110, 128
- ADS 9689, 130
- ADS 9716, 116, 131
- ADS 9744, 111, 130
- ADS 9747, 129
- ADS 9982, 108, 126
- ADS 10075, 116, 131
- ADS 10140, 112
- ADS 10158, 119, 131, 132
- ADS 10188, 131, 132, 135
- ADS 10360, 130
- ADS 10585, 131, 136
- ADS 10598, 85
- ADS 10680, 130
- ADS 10786, 131
- ADS 11046, 116, 131
- ADS 11579, 120, 121
- ADS 12126, 120, 136
- ADS 14424, 121, 122
- ADS 14775, 130
- ADS 15300, 122
- ADS 16173, 122, 123
- ADS 16314, 128
- ADS 16497, 116, 117
- ADS 17178, 129
- Aerobee-Hi rocket, 284, 308,
311
- Agassiz-Millstone interferom-
eter, 194, 199
- Age
of the Galaxy, 41
solar structures, 14
stellar, 597
see also Evolution
- Aggregation
see Accretion
- AH Cep, 98
- Air
gamma-ray absorption,
491
- Aircraft observations
solar, 163
coronal, 213, 232

- X-ray, 326
 Air Force Cambridge Research Laboratory, 284
 Air shower experiments
 gamma-ray, 519
 Airy diffraction disk, 143, 144
 Airy profile, 142
 Aitoff projection
 of galactic coordinates, 331
 Albedo radiation
 gamma-ray, 511
 Alfvén waves
 coronal, 234
 in stellar atmospheres, 71
 Algol systems, 27, 36
 Allegheny Observatory, 137
 Alouette I, 222
 Alpha particles, 503
 in gamma-ray production, 499
 in nuclear reactions, 525, 556, 559, 562, 563
 Alpha process, 565
 Aluminization
 of telescope optics, 57
 Aluminum, 287
 nuclear reactions, 561, 568
 solar abundance, 282, 283, 285, 292, 298, 383
 Aluminum filters, 284
 Aluminum reflectors, 279
 AL Vel, 99
 Ambient magnetic field
 solar, 7
 Ambiplasma theory
 of quasi-stellar objects, 447
 Am stars
 binary, 30, 31
 Analytical integration
 for cross sections, 493
 Analytic treatments
 in hydrodynamics
 of rotating fluids, 465
 of spiral structure, 461
 Anastigmats
 for astronomical telescopes, 46
 λ And, 155
 Andromeda Nebula
 gamma radiation, 510, 521
 Angular gain, 329
 Angular momentum
 in binary systems, 32, 36, 39-40
 conservation
 in nuclear reactions, 550
 in rotating fluids, 474
 in the solar corona, 240
 in the solar system, 267, 268, 270, 273, 274, 275, 276, 277
 Angular momentum integral
 in the analysis of disk galaxies, 455
 Angular momentum loss
 and stellar evolution, 605
 Angular resolution
 of interferometers, 143, 149
 of solar observations, 1, 2, 12
 Angular size
 of radio sources, 199
 Anisotropic flow
 coronal, 251
 Anisotropic solutions
 cosmological, 631-32, 641-43
 Annihilation theory
 and quasars, 446-47
 Annihilation time
 positron, 505, 506
 Annular diaphragm, 153
 Antenna temperature
 OH observations, 208
 Antibaryons
 and cosmology, 628
 Anticoincidence counters
 in gamma-ray astronomy, 512, 513, 514, 515, 517, 518
 Anti-inversion
 of populations
 for OH molecule, 203
 Antimatter
 cosmological implications, 628
 in gamma-ray production, 481, 520
 see also Matter-antimatter annihilation
 Antinucleons
 cosmological implications, 638
 Antiprotons, 487
 see also Proton-antiproton reaction
 Antiquarks
 cosmological implications, 637
 "Antispiral theorem," 456
 AO 0118 +03, 404
 AO 0952 +17, 405
 AO Cassiopeiae, 29
 Apertures
 in astronomical telescopes, 45, 56, 64
 solar observations, 2, 4
 Apparent magnitude-redshift
 relation for quasars, 430
 Apsidal rotation, 95
 σ Aql, 98
 μ Aquarii, 31
 Argon
 in nuclear reactions, 561
 in quasi-stellar objects, 407, 415
 solar abundance, 292
 Ara X-1, 334
 AR Aur, 97, 131
 AR Cassiopeiae, 33
 Arches
 coronal, 237, 253
 Archimedes spiral
 configuration
 of interplanetary plasma, 234, 238, 258
 solar-particle trajectories, 373, 389
 Arecibo
 observations
 of quasi-stellar objects, 426
 Ariel I, 279, 313, 317
 Ariel II, 279
 AR Lac, 99, 101
 AR Mon, 99
 AS Eri, 98, 101
 Associations
 stellar, 37
 A stars
 in binary systems, 28, 29, 30, 34, 96, 97, 109
 Asteroids
 formation, 271, 273, 278
 Astrometric instruments, 55-56
 Astronomical optics, 45-66
 Asymmetry
 charge
 cosmological implications, 628
 Asymptotic fields, 72
 Asymptotic procedures
 in dynamics
 of disk galaxies, 455, 461
 A systems
 of binary stars, 28, 29
 Atlas of Peculiar Galaxies, 428-29
 Atmospheres
 planetary, 139
 stellar
 hydrodynamics of, 67-83
 model, 615
 Atmospheric background
 gamma radiation, 509
 Atmospheric Cerenkov light, 516, 517
 Atmospheric filtration
 of X rays, 326
 Atmospheric transparency
 terrestrial, 62, 294
 Atomic binding energy, 528
 Atomic energy levels
 perturbations
 by solar fields, 254
 Atomic notation, 526

- Atomic number, 487, 492, 498
- Attenuation
by solar corona, 216, 234
see also Extinction
- AU Mon, 98
- α Aur, 85, 119
- ζ Aur, 123
- Aurorae
and magnetic fields, 169
and solar particles, 357, 380
- Autocorrelation function, 74
chromospheric, 71
coronal, 238
- Averaging techniques
in solar observations, 4
- Avogadro's number, 495, 527
- AW Her, 99
- AW Peg, 98
- Axissymmetric modes
in disk galaxies, 456, 460
- AZ Cas, 99
- B**
- Background
cosmic black-body back-ground, 627, 635-37
gamma-ray, 490
galactic radio, 200
sky
optical, 62
X-ray, 328
- Balloon observations, 318, 334, 337, 351-53, 358, 382
- cosmic-ray, 170
gamma-ray, 481, 482, 512, 514, 519
solar, 163
coronal, 213
X-ray, 325, 326
- Balmer discontinuity, 412
in quasars, 417
- Balmer series, 284
in quasi-stellar objects, 400, 403, 416
- Bandpass filters
for quasar observations, 418
- Band structure
quasar observations, 40
- Barium titanate transducers, 163
- Barlike structure
in spiral galaxies, 454, 457
- Bar magnet
solar field, 225
- Barrier penetration effects, 560
see also Coulomb barrier
- Baryons
cosmological implications, 628
conservation, 638, 643
and gamma-ray production, 482, 483, 498-99
"Basic Astronomical Data," 96
- BASJE, 517, 522
- Baumbach-Allen model, 244, 250
- B-cloud
solar nebula, 272
- Beam divergence
OH observations, 205
- Bending modes
in disk galaxies, 457
- Beryllium, 383
nuclear reactions, 534, 541, 543, 546, 547, 548, 555, 562, 563, 567
as optical material, 63
solar abundance, 292
- Be stars
and stellar evolution, 602-3
- Beta decay, 562
- Betatron effect, 386, 389
- BH Vir, 96
- Bifurcation
point of, 468, 469
- Binary stars, 25-44
classification, 26-29
eclipsing
bibliography and program notes on, 96
mass determination, 85-103
frequency, 30-36
origins, 37-42
visual, 105-39
- Binding energy
atomic, 528
Fermi-Thomas, 530
of quasars, 444
- Bipolar regions
solar, 8, 11
- Birefringent filters, 308
- Birefringent interferometer, 148, 149
- Black-body emission, 336, 338, 347
cosmic, 490, 497, 504, 627, 635-37
see also Background
- Blanks
for astronomical telescopes, 62-63
- Blast-wave acceleration
of solar particles, 386
- Blazed gratings, 64
- Blaze wavelength, 54
- Blending
of spectral lines, 39
see also Line formation
- Blue corrected lenses, 51
- Blue excess
X-ray sources, 333
- Blue galaxies
and quasi-stellar objects, 403
- Blue shifts
cosmological, 645
of quasars, 435
"Blue star"
X-ray sources, 333
- Blue stellar objects, 399
- Bolivian Air Shower Joint Experiment, 517
- Bolometric corrections, 119
implications for stellar evolution, 597
- Bombardment energy
parameter
in nuclear reactions, 564
- Boron, 383
nuclear reactions, 534, 543, 545, 546, 547, 548, 555, 567
solar abundance, 292
- Boson gas
cosmological, 637
- Boundaries
of structures
solar, 9
- Boundary conditions, 242
hydrodynamic
in rotating fluids, 478
in stellar atmospheres, 67
- Boundary-layer calculations
for rotating fluids, 476
- Bound-bound transitions
and stellar evolution, 581
- Bound-free processes
in stellar evolution, 587, 590
- Bourdon pressure gauge, 162
- Bragg spectrometer, 280, 286, 287, 308
- Branching ratios
particle, 503
- Breit-Wigner formula, 540-41
- Bremsstrahlung, 301, 314
in gamma-ray production, 483, 485, 494-96, 506, 507, 508, 509
in quasars, 419
in X-ray production, 337
see also Collisional bremsstrahlung; Magnetic bremsstrahlung
- Bright galaxies
and quasars, 428-29
- Bright line spectrum, 280
see also Emission
- Brightness
magnetic-field correlation
solar, 2, 4
radio, 170
surface, 399
- Brightness temperature, 173
coronal, 247, 293, 294, 301, 321

- OH, 189, 199, 200, 203,
204, 210
quasar, 399
Broadening mechanisms
for spectral lines
in binaries, 33
in OH sources, 186,
210
in quasars, 414, 436
Brownian motion
of solar nebular, 274
Brunt-Vaisala frequency, 72,
74, 78
BSO-I, 402, 405, 407
B stars
binary, 29, 34, 38, 92,
98
Bundles
force lines
solar, 9, 10
Buoyancy force
in rotating fluids, 475
in stellar atmospheres,
71
Bursts
and coronal activity, 213,
223, 224, 232, 250, 252,
255, 256, 257
B-V
for binary stars, 28
see also UBV
C
3C 2, 404, 408, 421
3C 9, 401, 404, 407, 409,
416, 425, 437
3C 33, 429
3C 39, 404
3C 43, 404, 421
3C 47, 401, 404, 406, 408,
421, 425
3C 48, 399, 400, 403, 404,
408, 407, 408, 410, 412,
413, 416, 420, 421, 425,
426, 428, 436, 447
3C 57, 404, 408
3C 84, 423
3C 93, 404
3C 94, 408
3C 119, 404, 425, 426
3C 120, 423
3C 138, 404, 408, 426
3C 147, 401, 404, 406, 408,
425, 426, 447
gamma-ray observations,
521
3C 172, 404
3C 175, 404, 408
3C 175.1, 404
3C 181, 404, 408
3C 186, 405, 408
3C 190, 405
3C 191, 407, 409, 410,
414
3C 198, 400, 405, 408,
421
gamma-ray observations,
521
3C 204, 405, 408
3C 205, 405
3C 207, 405, 408
3C 208, 405, 408
3C 215, 405, 408
3C 216, 401, 405, 421
3C 217, 405
3C 230, 405
3C 232, 405, 408
3C 239, 405
3C 245, 401, 405, 408,
416
3C 249.1, 408
3C 254, 408
3C 261, 405
3C 263, 405, 408, 409
3C 268.4, 405, 408
3C 270.1, 405, 409
3C 273, 399, 400, 403, 405,
403, 407, 408, 410, 411,
412, 413, 414, 416, 417,
419, 420, 421, 422, 423,
425, 426, 428, 433, 434,
439, 440
3C 273B
gamma-ray observations,
510
3C 275.1, 405, 408, 429
3C 277.1, 405, 408
3C 279, 405, 408, 417, 419,
421, 422, 423, 426
3C 280.1, 405, 409
3C 281, 405
3C 286, 400, 405, 408, 416,
426, 447
3C 287, 405, 408, 426
3C 288.1, 405, 408
3C 295, 432, 447
3C 298, 401, 406, 409,
425
3C 309.1, 406, 408
3C 323.1, 406, 408
3C 334, 406, 408
3C 336, 406, 408
3C 343, 429
3C 345, 406, 408, 416, 419,
421, 423, 424, 426
3C 351, 406, 408
3C 380, 406, 408, 416,
426
3C 418, 423
3C 432, 406, 409
3C 435, 406
3C 446, 406, 408, 416, 417,
419, 420, 421, 422, 424,
430, 434
3C 454, 406, 409
3C 454.3, 406, 408, 421,
423
4C -4.6, 404
4C 20.33, 406, 408
4C 21.35, 405, 408
4C 21.38, 409
4C 22.22, 405
4C 22.38, 405
4C 29.68, 405, 408
4C 31.38, 405
4C 37.24, 405, 408
4C 39.25, 405, 408
Ca K-spectrohellogram, 308
Calcium
absorption, 162
interstellar, 155
coronal, 221
emission
in binaries, 86
blue-star, 333, 347
coronal, 232
solar, 4, 6, 10
plages, 321
in quasars, 409
solar, 292, 294, 298,
299
Californium
and gamma-ray production,
500
Cambridge survey, 172
see also 3C
Cameras
telescope
see Astronomical optics
Cancellation techniques
in solar observations,
3
Capture hypothesis
of binary-star formation,
37
 η Car
OH in, 192
Carbon, 347, 352, 383
blue-star emission, 333
and gamma-ray production,
499, 511
nuclear reactions, 526, 535,
540, 542, 544, 546, 547,
552-57, 563, 564, 565,
567, 575-78, 584
in quasars, 407, 413, 415,
416, 422
solar, 281, 282, 283, 284,
286
solar abundance, 282, 283,
292, 293, 294, 298, 299
X-ray absorption by,
327
Carbon burning, 564
and stellar evolution, 579
Carbon flash
in stellar evolution, 579
Carbon-helium interface
in stellar evolution, 579
Cartesian coordinates
in rotating fluids, 478
Cas A, 329, 330, 334
Cas B, 332
Cascade processes
in gamma-ray production,
511, 512, 516
in OH emission, 203,
205
Cassegrain Fabry-Perot inter-
ference photometer, 151

- Cassegrainian systems
of telescope optics, 48, 51,
54, 56
- Cassegrain-Maksutov tele-
scope, 308
- Casseopeia A
gamma-ray observations,
521
- OH observations, 184, 185,
186, 189, 191, 192, 199,
201
- Casseopeia-Taurus group,
37
- Cas X-1, 334
- Cataclysmic variables, 99,
571
- Cathodes
in astronomical telescopes,
59, 61
- 4C Catalog, 401
see also 4C
- CC Cas, 98
- C-cloud
solar nebula, 272
- CD Tau, 101
- Cells
magnetic
solar, 1, 9, 16
- α Cen, 114
- γ Cen, 116, 129
- Centaurus A
gamma-ray astronomy,
510
- Center-of-mass system
in analysis of gamma-ray
production, 493
- Center-of-momentum energy
in nuclear processes, 528,
532, 533, 539, 544,
550
- Central condensation
rotating fluid, 470, 473
- Central density
stellar, 604
- Central mass
planetary systems, 272,
273, 276
- Central meridian passage,
282
- Central temperature
stellar, 572, 577, 586, 592,
594, 603, 604
- Centrifugal acceleration
in rotating fluids, 469,
470
- in spiral galaxies, 454
- Centrifugal barrier
nuclear reactions, 539
- Centrifugal potential
in rotating fluids, 466
- Centripetal acceleration
in rotating fluids, 466
- ζ Cephei A, 31
- Cepheid instability strip, 598,
599, 606,
607
- Cepheid variables
cosmological implications,
630
- spherical waves in, 67,
81
- and stellar evolution, 606-
11
- Cerenkov counters, 513, 514,
515, 518, 519
- Cerenkov light, 516, 517
- Cerenkov radiation
from quasars, 419,
420
- Cervit
as an optical material, 62-
63
- C-field theory
of cosmology, 633
- Chalonge spectrograph,
416
- Chandrasekhar limit, 472
- Channeled spectrum, 147,
148
- Channeling
magnetic
of solar particles, 240,
390
- Characteristic frequencies
hydrodynamic modes, 78
of rotating fluids, 473
see also Eigenfrequencies
- Characteristic photon energy
in gamma-ray production,
485, 495, 496
- Characteristic times
hydrodynamic, 69
of planetary formation,
271
- solar
fields, 9
flow, 240
of variation
in quasars, 420
- Characteristic vectors
in rotating fluids, 477
- Charge asymmetry
cosmological implications,
628
- Charged-particle flux
and gamma rays, 481,
486
- Charged-particle interactions,
539, 544, 561, 566-
67
- cross sections, 538-55
resonant, 546-49
- Charged-particle showers,
518
- Charged-pion multiplicity
gamma-ray production,
501
- Charge exchange reactions
in stellar atmospheres,
71
- Charge-symmetric universe,
638
- Charge-to-mass ratio, 382,
387
- Chemical composition
of binaries, 87
- cosmological implications,
629, 632, 640
- of gamma rays, 481, 488,
489
- metagalactic, 340
- of solar particles, 363,
382
- of solar system, 267, 278
- stellar, 572
- Chemical reactions
in stellar atmospheres, 7
see also Nuclear reactions
- Chlorine
nuclear reactions, 561
solar, 292
- Chromatic aberration, 46,
48, 51, 56
- Chromium
solar, 290, 292
- Chromosphere
heating of, 76, 80, 82-
83
- solar, 6, 9, 14, 271, 280
and corona, 220, 236
particle flux, 383
waves in, 67, 69
- Chromosphere-corona inter-
face, 213, 248, 296
- Chromospheric prominences,
229
- Chromospheric spicules,
233
see also Spicules
- Circularly polarized light
from OH sources, 171, 193,
205, 209
- in interferometry, 148
- Circular motion
in disk galaxies, 456
- Circular orbits
for binaries, 34, 35
- Circulation
gaseous
in spiral galaxies, 454,
458
and stellar evolution,
603
- Cislunar probes, 335
- Classification
binary systems, 26-29
- Close binaries, 25, 27, 28,
30, 38, 42, 109, 120,
121
- mass ratio, 85
and stellar evolution, 571
and X-ray sources, 333,
345
- Closed-form solutions
in rotating fluids, 467-70
- Closed universe, 629, 635
- Cloudlets
in the solar nebula, 274
- Cluster age
and stellar evolution, 621,
623, 624

- Cluster binaries, 30, 32, 35, 36, 37, 112-15
 - rotation, 124, 129
- Cluster diagrams, 598, 606
 - stellar evolution implications, 597
- Cluster locus
 - and stellar evolution, 608, 614, 615, 618, 621
- Clusters
 - polarization in, 168
 - see also Star clusters; Galaxy clusters
- Cluster variables
 - and stellar evolution, 623
 - see also Cepheids
- CM Lac, 97, 101
- CMP, 262
- CN cycle, 572, 587, 588, 591
- CN lines, 157
 - cosmological implications, 635
 - interstellar, 139
- CNO bi-cycle, 526, 563
- Cobalt
 - solar, 292
- CO bands
 - solar, 287, 290, 296
- CO₂ lines
 - in Martian atmosphere, 139
- Coelostat mirror, 56
- Coherence scale
 - for galactic fields, 173
- Cold streamer
 - coronal, 252
- "Cold" theory
 - of planetary formation, 271
- Cold-universe model, 629, 635
- Collapsed stars
 - protostars, 277
 - quasars as, 410, 411, 427
- Collective interaction
 - in disk galaxies, 457
- Collective modes, 71
 - in disk galaxies, 455-57
- Collector mirror, 281
- Collimation
 - gamma-ray detector, 512
 - mirror
 - of astronomical telescopes, 56, 64
 - particle
 - by interplanetary fields, 354
- Collisional bremsstrahlung, 463, 494-96
- Collisional damping
 - coronal, 250
- Collisional excitation mechanisms
 - in OH, 188
- Collisional ionization, 296, 318
- Collisions
 - in solar nebula, 273, 274
- Color changes
 - in quasi-stellar objects, 421
- Color-luminosity relation
 - for binary stars, 87, 106, 121
 - in stellar evolution, 607, 609
- Color-radius diagram, 103
- Color-redshift relation
 - for quasars, 418
- Colors
 - for binary stars, 28
- Coma cluster
 - X-ray source, 332, 347
- Comatic image, 46, 48, 50, 51, 54, 56
- Coma X-1, 334
- Cometesimals, 277
- Comets
 - and solar nebula, 277
 - and solar wind, 240, 241, 245
- Commission 33, 453
- Common-motion pairs, 118
- Co-moving coordinates, 642
- Comparators
 - oscilloscopic scanning, 88
- Compensating plates
 - in an interferometer, 159
- Complete screening, 493, 495
- Complex sources
 - quasi-stellar, 426
- Composite spectra
 - of binaries, 38
- Composition changes
 - in stellar evolution, 590, 596, 602, 607, 610
- Compound nucleus, 527, 533, 544
- Compressibility
 - of stellar atmospheres, 71
- Compressible fluids
 - rotating, 473
- Compression modes, 72
- Compton collisions
 - in quasi-stellar objects, 420
- Compton processes
 - and gamma-ray production, 485, 490, 492, 494
 - in quasi-stellar sources, 435
- Compton scattering, 321, 483, 496-98, 506, 507, 508, 509, 511, 516, 520
- Compton telescope, 513
- Concave-grating spectrograph, 306
- Concave lenses
 - for astronomical telescopes, 59
- Concrete shielding
 - of gamma-ray detectors, 517
- Condensation mechanisms
 - in the solar nebula, 271
- Condensations
 - coronal, 216, 220, 225, 227, 228, 238, 253
 - planetary, 268, 270, 273, 274, 275, 277, 278
 - see also Interstellar matter; Protostars
- Condensation theory
 - of star formation
 - for binary stars, 37
- Conduction model
 - of the solar corona, 250, 251
- Conductive losses, 83, 299
 - coronal heating, 246
- Conductivity
 - in the solar nebula, 276
 - of optical materials, 62
- Cone of avoidance, 262, 263
- Configuration interaction, 290
- Conjugate pairing
 - of spiral modes, 457
- Constant density
 - surfaces of, 466
- Constant phase
 - surfaces of, 73
- Constant pressure
 - surfaces of, 466
- Constitutive relations
 - in stellar evolution, 580, 581
- Contact systems
 - binary, 28, 29, 37, 40, 41
- Continuous absorption, 293
- Continuous creation, 445, 481
- Continuous monitoring, 313
- Continuous spectrum
 - cosmic radiation, 488
- Continuum observations
 - of OH sources, 186, 189, 195, 198, 199, 200, 209
 - of quasars, 412, 414, 416-20
 - of radio galaxies, 170, 172-73, 175, 179
 - solar, 4
 - coronal, 216
 - of X-ray sources, 325, 326, 333, 337
- Continuum reaction rates
 - for nuclear processes, 559-62, 568
- Contraction phases
 - pre-main sequence, 37
 - in rotating fluids, 470
 - of solar nebular, 274, 276

- in stellar evolution, 571, 574, 583, 590, 592, 605, 612
- of universe, 633
- Convective core
 - stellar, 572, 578, 586, 587, 590, 591, 592
- Convective envelope
 - in binary systems, 119
 - stellar, 573, 588, 593
- Convective instability, 79
- Convective losses
 - coronal, 251
- Convective mixing
 - and stellar evolution, 576
- Convective turbulence
 - and stellar evolution, 605
- Convective zones
 - and planetary formation, 276
 - solar, 7
 - stellar, 67, 72
- Convention
 - polarization, 193
- Convergent-point method, 124, 597, 598, 602
- Converters
 - for gamma-ray detection, 514
- Convex lenses, 59
- Convolution techniques
 - in analyzing interferometer, 142, 144
- Cooke triplet, 46
- Cooling law
 - of Newton, 69
- Cool stars
 - giants, 99
 - see also Late-type stars
- Coplanarity
 - of planetary orbits, 267
- Core
 - of binary system, 39
 - stellar
 - helium burning, 577-78, 583, 595, 597, 609
 - hydrogen burning, 572-74, 583
- Core contraction
 - stellar evolutionary, 576, 592
- Core-halo objects, 427
- Coriolis acceleration
 - in rotating fluids, 475
- Corona, 14, 213-66, 280
 - density structure, 213-17
 - fields, 169
 - magnetic, 253-61
 - heating, 76, 280
 - particle flux, 383
 - and the solar nebula, 271
 - temperature structure, 247-53
- Coronagraphs, 213, 225, 241
- Coronal condensations, 311
 - see also Condensations
- Coronal isophotes, 230, 231
- Coronal radiance, 215, 220
- Coronal rings, 306
- Coronal thermometer, 250
- Coronal whip, 237
- Coronameter, 223
- Co-rotation
 - of solar corona, 238, 241
 - of solar field, 373, 376, 380
- Corpuscular radiation
 - celestial, 481
 - solar, 240
- Corrected lenses
 - for astronomical telescopes, 51
- Corrector plate
 - for telescope optics, 46, 47, 48, 49, 52, 54, 58
- Correlation studies
 - of galactic magnetic fields, 168, 178
 - of quasi-stellar objects, 418-19, 430-33
- Cosmic fireball
 - background radiation from, 200, 628
- Cosmic-ray anisotropy, 169-70
- Cosmic-ray density, 481
 - cosmological implications, 628, 638
 - galactic, 188
 - solar, 231, 234, 236
- Cosmic-ray electrons
 - galactic, 170
- Cosmic-ray pressure, 169
- Cosmic-ray spectrum, 171
 - galactic, 363
 - solar, 353
- Cosmic X rays, 325
- Cosmological constant, 634
- Cosmological distance
 - of quasars, 414, 416, 424, 427, 429, 433, 434
- Cosmology, 627-46
 - and gamma-ray production, 481, 485
 - and planetary formation, 268
 - and quasars, 411, 413, 417, 428, 429, 430, 433-35, 445-46
- Coudé focus
 - in astronomical optics, 54, 55, 64, 96
 - spectrometer, 139, 150, 154
- Coulomb-barrier potential
 - and gamma-ray production, 498
 - penetration of, 538, 539, 551
- Coulomb bremsstrahlung
 - and X-ray production, 337
- Coulomb scattering, 483
- Coupling
 - magnetic, 276
- Crab Nebula, 258
 - as gamma-ray source, 485, 500, 509, 510, 519, 520, 521
 - polarization studies, 167
 - as X-ray source, 331, 332, 333, 334, 335, 339, 343, 345-47, 348
- Critical densities
 - coronal, 251
- Critical mass
 - for neutron star, 440
- Jeans, 644
- Critical points
 - in rotating fluids, 476
- Critical radius
 - coronal, 251
- Critical wavelength
 - for fragmentation, 631, 643
- Cross section
 - absorption, 295
 - annihilation, 505
- Compton, 491
- gamma-ray production, 498
 - interaction
 - neutrino, 481
 - ionization
 - coronal, 247
 - resonant
 - X-ray, 326
- Cross-section factor
 - for nuclear reactions, 539
 - and stellar evolution, 584
- Crown glass
 - for telescope optics, 46
- Crown prominences, 8
- Crystal spectrometer, 286
- CsI detectors
 - for gamma rays, 512, 514, 517
- C straps, 288
- CTA 21, 425
- CTA 102, 406, 408, 416, 422, 425, 434, 447
- CTD 141, 406, 408
- Curvature
 - radius of, 387
- Curvature of space
 - and cosmology, 629
- Cutoff frequency
 - hydrodynamic, 72
- CV Ser, 98
- Cyanogen observations
 - cosmological implications, 635
- Cyclotron frequency
 - for solar particles, 390

α Cygni, 155
 Cygnus A, 330, 331, 407, 447
 gamma-ray observations, 510, 521
 OH observations, 192
 Cygnus gamma-ray source, 482, 519
 Cygnus Loop
 X-ray source, 332, 334
 Cyg X
 OH observations, 192
 Cyg X-1, 330, 334, 336, 337, 344, 347
 Cyg X-2, 333, 334
 Cyg X-3, 334
 Cyg X-4, 334
 Cyg X-5, 334
 Cylindrical coordinates
 for rotating masses, 465

D

Damping
 collisional, 250
 effects
 hydrodynamic, 70, 80
 Damped oscillator model
 of stellar atmospheres, 71
 Dark emission, 157
 Darkening
 continuum
 in the Sun, 4
 Dark-line spectrum, 280
 Darwin ellipsoids
 in rotating fluids, 478
 D-cloud
 solar nebula, 272
 DeBroglie wavelength, 533
 Decay
 radioactive, 482, 500-4
 of solar magnetic fields, 1, 3
 β decay
 cosmological implications, 639
 Decay characteristics
 solar events, 356, 358, 376
 Decay lifetime
 nuclear, 529
 Decay modes
 meson and hyperon, 503
 Deceleration parameter
 and quasars, 413, 417
 Decoupling
 of radiation field
 from particle flux, 630
 Dedekind's theorem
 for fluid motion, 468
 De-excitation
 collisional
 in quasi-stellar objects, 416
 nuclear, 483, 498-99,

500, 511
 Degeneracy
 electron
 in stellar evolution, 587
 relativistic, 642
 Degenerate modes
 in rotating fluids, 472, 473
 in spiral structure, 457
 Delta function
 instrumental function, 142
 Densitometer tracing, 155, 288
 see also Microdensitometer
 Density
 of matter
 coronal, 213-47
 see also Intergalactic medium; Interstellar matter
 of stars
 binary, 37-38
 Density scale height
 parameter
 in stellar evolution, 572, 588
 Density stratification
 in rotating fluids, 466, 471
 Density wave theory
 for spiral galaxies, 454, 458, 460, 462, 463
 Depletion rate
 partial, 528
 Depolarization
 galactic, 173, 177
 Detectability
 of binary stars, 33, 35, 38
 of solar fields, 20
 Detectors
 gamma-ray, 511-17
 Detector threshold, 368
 Deuterium
 lines
 and OH observations, 184
 nuclear reactions, 536
 and X-ray production, 499
 Deuteron flux
 cosmological implications, 541
 solar, 387
 Deviation curve
 for nuclear reactions, 554
 Diagnostic diagram, 72, 74
 Diagnostic parameter
 for X-ray observations, 337
 Diamond
 as an optical material, 64
 Diaphragm
 interferometer, 142
 Diaphragm-effect, 142
 Dielectric coatings
 for telescope mirrors, 146

Di-electronic recombination, 340
 coronal, 247, 300, 311
 Differencing photometer, 2
 Differencing techniques
 in solar observations, 2
 Differential absorption
 of OH, 204
 Differential electron spectrum, 508
 Differential energy spectrum
 gamma-ray, 484, 487, 504
 high-energy particles, 352, 361, 378
 solar, 378
 Differential photon intensity
 and gamma-ray production, 484, 498, 518
 Differential rotation
 of galaxies, 454, 455, 456
 of magnetic configuration, 168, 179
 of Sun, 228
 solar, 9, 12, 14
 solar nebula, 275
 Diffraction
 in telescope optics, 56
 Diffraction disk, 143
 Diffraction gratings, 139
 see also Gratings
 Diffraction limit, 143-44
 Diffraction scattering, 328
 Diffuse nebulae
 interferometry of, 150
 Diffusion coefficient
 for solar particles, 390, 391
 Diffusion effects
 radiative
 in the theory of stellar evolution, 587, 624
 solar particles, 358, 360, 373, 386, 393
 in stellar atmospheres, 71
 X-ray, 345
 Diffusion equation, 391
 Diffusion velocity
 in quasi-stellar objects, 414
 Digital ratio recorder, 157
 Dimensionless parameters
 cosmological, 646
 Dipole field
 solar, 240, 259
 see also Magnetic dipole
 Dipole matrix elements, 325
 Dipole singularity
 in disk galaxies, 457
 Dipole sum rule, 325
 Dirac delta function, 142
 Directional intensity
 of solar particles, 392
 Directionality

- of gamma-ray detectors, 517
 - Direct orbits
 - of comets, 241
 - Discharge spectrum, 288
 - Discrete events
 - solar, 351
 - see also Bursts; Flares
 - Discrete sources
 - coronal occultations, 217, 230, 233
 - OH, 192, 195
 - radio
 - and gamma-ray observations, 485, 489-91, 508-11
 - X-ray, 328
 - see also Lunar occultation; Occultation techniques
 - Discrete structures
 - solar, 11
 - Disintegration
 - in solar nebula, 278
 - Disk
 - galactic
 - magnetic fields in, 170, 171
 - theory
 - of planetary formation, 258
 - Disk galaxies
 - dynamics of, 453-63
 - Disk stars
 - binary, 100, 106, 119, 123
 - Dispersion
 - of observations
 - of quasars, 431
 - radial, 146
 - radio wave
 - coronal, 247
 - of spectrographs, 53, 57, 64
 - in solar observing, 2, 3
 - Dispersion equation, 72, 73
 - for disk galaxies, 460, 461
 - Dispersion velocity
 - in disk galaxies, 455, 456, 461
 - Dispersive solution
 - in hydrodynamics
 - of stellar atmospheres, 69
 - Displacement vector
 - main-sequence, 605
 - Dissipation
 - of energy
 - in rotating fluids, 474
 - in solar nebula, 269, 270, 272, 273
 - in stellar atmospheres, 69, 81
 - Dissociation
 - molecular
 - in solar nebula, 277
 - in stellar atmospheres, 71
 - Distance
 - binary separation, 27
 - Distance moduli
 - binary, 124
 - cluster, 598
 - Distance-redshift relation
 - for quasi-stellar objects, 430
 - Distance-volume effect
 - in quasars, 432
 - Distortion
 - binary, 28
 - field
 - in astronomical optics, 54, 57
 - plate, 144
 - Distribution function
 - binary, 36
 - gamma-ray, 502
 - Diurnal variation
 - in cosmic-ray flux, 170
 - D lines
 - in binary stars, 90, 92, 98
 - solar, 7
 - coronal, 245
 - DN Ori, 98
 - Doppler fields
 - in stellar atmospheres, 67, 74
 - Doppler shifts, 149
 - coronal, 231, 237, 243, 247
 - interferometric measurement, 145
 - OH sources, 205, 209
 - quasars, 410, 411
 - see also Redshifts
 - Doppler widths
 - coronal lines, 249
 - Double-dispersion spectrograph, 281
 - Double-filament structure
 - solar field, 386
 - Double fronts
 - coronal, 257
 - Double-lined binaries, 25, 85, 89, 96, 97
 - Double radio sources
 - OH sources, 195
 - quasars, 426, 429
 - Double-refracting materials, 64
 - Double-shell burning
 - in stellar evolution, 610
 - Double-slit photoelectric photometer, 2
 - Double stars
 - and the theory of rotating fluids, 469, 470
 - see Binary stars
 - Doublet anastigmats, 46
 - Drift
 - of coronal structures, 223
 - of solar magnetic fields, 1
 - see also Migration
 - Dust
 - interstellar, 328
 - and OH observations, 199
 - see also Interstellar matter
 - Dwarf stars
 - binary, 112
 - and planetary formation, 275, 276
 - see also Main sequence
 - d-wave scattering, 563
 - Dwingeloo survey, 172, 178
 - Dynamical balance
 - in disk galaxies, 455
 - Dynamic pressure
 - coronal, 258
 - Dynamic range, 338
 - of interferometer, 149
 - Dynamics
 - of galactic structure, 179
 - disk galaxies, 453-63
 - of stellar atmospheres, 67-83
 - coronas, 237-47
 - Dynamo mechanism
 - cosmological, 632
- E
- Early-type stars
 - binary, 30
 - and planetary formation, 268, 273, 276
 - see also O stars; B stars; A stars
 - Earth, 268, 272
 - atmospheric gamma radiation, 511, 512
 - interplanetary magnetic field
 - near, 19
 - magnetosphere, 169, 213, 234, 240
 - Eccentricity
 - ellipsoid
 - in rotating fluids, 464, 471
 - orbital
 - of binary orbits, 27, 107, 110
 - planetary, 267
 - Echelle gratings, 65, 139
 - Echelle spectrograph, 281
 - Eclipse observations
 - coronal, 215, 217, 219, 229, 231, 237, 249, 259
 - Eclipsing binaries, 25, 26, 27, 36, 41
 - mass determination, 85-103
 - Eddington approximation, 70
 - EE Peg, 97
 - Effective gravity

- parameter
 - in stellar evolution, 594
 - in rotating fluids, 469, 472
- Effective nuclear charge, 492
- Effective temperature
 - of binary stars, 86, 119
 - parameter
 - in stellar evolution, 603
- e-folding time
 - of coronal bursts, 250
- Eigenfrequencies
 - of MHD modes, 69
 - of rotating fluids, 473
- Einstein coefficients, 184
- Einstein's theory of relativity, 627
 - cosmological implications, 633
- Ejection hypothesis
 - for quasars, 435-36
- Elastic scattering
 - and gamma-ray production, 492, 493
- El Cep, 97
- Electric dipole transitions, 557
 - in OH, 184
- Electric fields
 - for focusing
 - in astronomical telescopes, 56
 - in solar corona, 238
- Electromagnetic processes
 - in formation of solar system, 271, 276
 - in gamma-ray production, 481, 483, 498-99, 504-5, 511, 512, 517
 - in X-ray production, 325, 326
- Electromagnetic waves
 - coronal, 223
- Electron II, 279, 313
- Electron IV, 279, 313
- Electron bremsstrahlung, 316, 495, 511
 - see also Bremsstrahlung; Collisional bremsstrahlung
- Electron collisions, 291
- Electron conduction
 - in stellar evolution, 594
- Electron degeneracy
 - and stellar evolution, 587, 592, 594
- Electron densities
 - coronal, 214, 215, 217, 219, 226, 232
 - in quasars, 412
- Electron energy spectrum, 174
- Electron events
 - solar, 352, 369, 390
- Electronic pulse counting, 140
- Electronic states
 - of OH, 204
- Electronic transitions
 - in nickel, 290
 - X-ray production, 337
- Electron impact, 296, 318
- Electron-positron interaction
 - and gamma-ray production, 483, 490, 492, 511
 - nuclear reactions, 564
- Electron-positron spectrum
 - from quasars, 447
- Electron pressure, 299
- Electrons
 - cosmic-ray, 170
- Electron scattering
 - and cosmological models, 629
 - in quasars, 414, 415, 416, 436
 - solar, 365
- Electron screening
 - and gamma-ray production, 493
- Electron temperature
 - coronal, 248, 250, 311, 313
 - in OH maser, 204
 - in quasars, 412, 415
- Electro-optic analyzing
 - of solar observations, 1
- Electrostatic bremsstrahlung, 440
- Elementary particles
 - and cosmological models, 627, 628-29, 637-38
 - see also Electrons; Mesons; Nuclear reactions; Protons
- Elevation
 - equipotential
 - on the Sun, 11
- Ellipse of constant scattering
 - coronal, 230-31
- Ellipsoidal stratification
 - in rotating fluids, 467
- Elliptical galaxies
 - and quasars, 429, 443
- Elliptical polarization
 - from OH sources, 193
- Ellipticity
 - of OH polarization, 193, 195
- Elliptic orbits
 - binary, 27
- Emission lines
 - extended sources, 140
 - solar, 2, 4
 - coronal, 221, 223, 237, 238, 247, 253, 283
 - spectrometry of, 149-52
 - ultraviolet, 279
 - see also Calcium emission; etc.
- Emission-line stars
 - and quasars, 400, 403
 - and stellar evolution, 602-5
- Emission measure, 298, 301, 302, 303
- Emissivity
 - galactic radio, 170
- Empirical main sequence, 597
- Empirical parameters
 - in high-energy nuclear physics, 555
- Emulsion
 - granularity of, 146
 - see also Astronomical optics
- Emulsion-spark-chamber
 - gamma-ray detector, 515
- Energy conservation
 - in fluids, 465, 466
- Energy equation
 - in hydrodynamics
 - of stellar atmospheres, 69
 - for the solar nebula, 269
- Energy generation
 - nuclear
 - in rotating fluids, 466
 - see also Nuclear reactions
- Energy generation rate
 - nuclear, 525, 532
- Energy integral
 - in disk galaxies, 455
- Energy losses
 - magnetohydrodynamic, 82
 - in the solar nebula, 269
- Energy resolution
 - of gamma-ray detectors, 511
- Energy spectrometer
 - gamma-ray detector, 514
- Energy transport
 - in rotating fluids, 467
- Enhancement
 - multiplet, 281, 308, 314
 - of nuclear rates, 526
- Entrance diaphragm, 142
- Entropy
 - cosmological implications, 633, 637
- Envelope
 - stellar
 - and binary stars, 39
 - and planetary formation, 268
- Envelope contraction
 - in stellar evolution, 577, 595
- Envelope expansion
 - in stellar evolution, 578
- Envelope pulsation
 - and stellar evolution, 606
- EO Aur, 98
- Epicyclic frequency
 - disk galaxies, 461, 462
- Epicyclic motion
 - disk galaxies, 458
- δ Equ, 85, 86

- Equation of continuity
in solar corona, 243
- Equations of motion
coronal, 245
hydrodynamic
in stellar atmospheres, 58
for solar nebula, 269
- Equation of state
fluid, 69
and quasars, 411, 465, 466
- Equation of transfer
for OH line frequencies, 201
- Equatorial mass loss
from rotating fluid, 472
and stellar evolution, 605, 606
see also Solar wind
- Equatorial velocity parameter
in stellar evolution, 602
- Equilibration time
for astronomical optical systems, 62
- Equilibrium
hydrostatic
coronal, 247
thermodynamic, 70
- Equilibrium abundances
in CNO bi-cycle, 563
and stellar evolution, 578
- Equilibrium models
for spiral galaxies, 454
- Equipartition condition
in quasars, 443
- Equivalent widths
instrumental, 150
in quasars, 413
- Erosion
of solar structures, 9, 12
- Error function
of aberration
in telescope optics, 51
- Error rectangle
of radio observations, 399, 400
- Errors
measurement
in binary systems, 26
- Eruptive variables, 30
- ER Vul, 96
- Escape hypothesis
cluster
of binary-star formation, 37
- Etalon
see Fabry-Perot interferometer
- Euclidean space
cosmological inferences, 641
quasars, 431, 432
- Evanescent modes
hydrodynamic, 72, 78
- Evaporation techniques
in optics, 63
- Evolution
cosmological, 630
and quasars, 400, 402, 430, 445
and X-ray sources, 329
of solar structures, 227, 228
stellar
and binary stars, 30, 116, 119, 120
and rotating fluids, 469
within and off the main sequence, 571-624
- Evolved objects
and quasars, 400, 402
- Exchange of stability
in rotating fluids, 477
- Excitation
processes
in OH sources, 188
in stellar atmospheres, 71
- Excitation temperature
coronal, 247
OH, 185, 186, 187, 189, 200
- Existence theorems
for solutions
in hydrodynamics, 465
- Exothermic association
O⁺ and protons, 202
- Expansion
coronal, 245
of optical materials, 62
shock waves, 82
of universe, 411, 627, 640, 642, 645
- Expansion effects
in solar magnetic fields, 3
- Explorer IV, 352
- Explorer XI
gamma-ray observations, 513, 514, 519, 520
- Explorer XII, 352, 373
- Explorer XIV, 352, 377, 378
- Explosive events
solar, 358
in the solar nebula, 273
- Exponential energy spectrum
of solar particles, 378
- Exposure times
for gamma-ray observations, 329
see also Photographic techniques
- Extended sources
emission, 140
interferometry of, 143
X-ray, 332, 338
- Extinction
interstellar
and OH observations, 199, 209
- see also Interstellar matter
- Extragalactic sources, 332, 347-48
quasi-stellar, 402, 411
radio
rotation measure, 177
X-ray, 328
see also 3C classifications
- Extraordinary modes
coronal, 255
- Extreme subdwarfs
and stellar evolution, 518
- Extreme UV, 308, 311-13
see also XUV
- Eye-piece interferometer, 105
- Eye-pieces
for astronomical telescopes, 45
- F
- Fabry-Perot interferometer, 3, 139-66
- Faculae
solar, 7, 19
and coronal activity, 221, 229, 230, 236, 239
- Faraday effect, 168, 172, 174, 175, 176
coronal, 258
- Far-infrared observations
OH lines, 203
- Far ultraviolet
solar, 287, 296, 304, 305, 313
- F corona, 216
- Fermi energy, 594
- Fermi mechanism, 256, 386, 387-88
- Fermion gas
cosmological models, 637
- Fermi-Thomas binding energy, 530
- Fiber bundles
coronal, 232
optical, 152
- Fibrils
solar, 7
- Field
in astronomical optics, 45
of parabolic reflector, 45
- Field correctors
in telescope optics, 51
- Field flatteners
in astronomical optics, 59, 64
- Field-free atmospheres
stellar, 67-83
- Fields
electric
focusing, 58
magnetic

- and brightness correlation, 2, 4
- see also Interplanetary; Solar magnetic; etc.
- Filamentary nebulae, 168
- Filamentary structure
 - coronal, 227
 - in interplanetary field, 373, 376
 - in solar magnetic field, 6, 7, 8
- Filter
 - auxiliary
 - in interferometers, 145
 - Filtergrams, 311, 312
 - Filtering
 - linear
 - in stellar atmospheres, 76
 - Filters
 - for astronomical photography, 53
 - Filtergrams
 - recording
 - intensity, 149
 - Filtrage, 142
 - Filtration
 - atmospheric, 326
- Finding List for Observers of Eclipsing Variables, 96
- Fine-scan magnetograms, 6
- Fine structure
 - of atomic levels
 - and quasars, 410, 437
 - of galactic magnetic fields, 177
- OH, 207
 - solar
 - coronal, 223
 - magnetic, 6
- see also Hyperfine structure; Small-scale magnetic fields
- Fission
 - spontaneous, 500
 - see also Nuclear reactions
- Fission hypothesis
 - of binary-star formation, 37
- Flare-associated prominences, 255
- Flare protons
 - and coronal observations, 234
- Flares
 - solar, 7, 8
 - coronal, 216, 223, 228, 234
 - gamma-ray observations, 511, 519
 - particle flux, 351, 353-76
 - see also X-ray flares
- Flash spectrum, 305
- Flatness defects, 144, 154
- Flattening index
 - for coronal isophotes, 230
- Flexure
 - of optical materials, 63
- Floccules
 - in the solar nebula, 274, 275
- Fluctuations
 - in quasar observations, 423
 - solar
 - intensity, 4
 - particle flux, 358, 374, 375
 - solar nebula, 274
 - and the theory of hydrodynamics
 - of stellar atmospheres, 69
- Fluid masses
 - in rotation, 465-80
- Fluorine
 - isoelectric sequence
 - and solar observations, 291
 - nuclear reactions, 535, 536, 543, 561, 568
 - solar, 292
- Flux
 - solar, 4
 - see also Particle
- Flux rope, 14
- f modes
 - rotating fluid, 473-74
- Focal length reducer, 145, 146, 147
- Focal plane diaphragm, 146
- Focal ratio, 45, 49, 50, 52, 54, 60
- Focusing
 - gravitational
 - and quasars, 447-48
- Focusing fields
 - in astronomical optics, 58
- Forbidden lines
 - from quasars, 411, 414, 415, 416
 - from the solar corona, 255, 281, 283, 291, 299
- Formation
 - Fraunhofer lines, 75
 - galaxy, 630
 - see also Protostars; Solar system; etc.
- Forward reaction, 532
- Forward-scattering detectors, 513
- Forward-scatter techniques, 352
- Fourier integral techniques
 - in model atmospheres, 73, 74
- Fourier transform devices, 140
- Fractional order
 - of interference, 146
- Fragmentation
 - of plage areas, 1, 4
 - of superstars
 - and quasars, 442, 445
- Fraunhofer lines
 - solar, 216, 280, 283, 287, 291, 292, 293
 - time variation, 75
- Fraunhofer maps, 310
- Free boundary problems
 - in fluids, 465
- Free-bound transitions
 - and gamma-ray production, 482
- Free-fall collapse
 - of superstars
 - and quasars, 442
- Free-free emission, 318, 320, 340, 341
 - and gamma-ray production, 482
 - and stellar evolution, 587
- Free precession
 - of galaxy, 457
- Freon
 - in interferometers, 162
- Frequency
 - binary, 30-42
- Frequency cutoff
 - hydrodynamic
 - in stellar atmospheres, 69, 72
- Frequency resolution
 - in OH observations, 186
- Frequency-wavenumber plane, 76
- Friedmann solution
 - for the universe, 631, 632, 637, 639, 641, 645
- Fringes
 - interference
 - photography of, 145
- Fringe visibilities
 - of OH sources, 210
- Frozen-in fields
 - in cosmological models, 632
- F stars
 - binary, 28, 36, 85, 97
 - planetary systems, 273
- Full-disk magnetic observations, 11
- Fundamental particle theories
 - of energy generation
 - for quasars, 446
- Fused silica
 - for telescope optics, 46, 49, 55, 60, 62, 64, 160
- f values, 297, 301
- FX Her, 97

G

- Gain
 - maser, 201
- Galactic age
 - and stellar evolution, 597
- Galactic center

- gamma-ray observations, 494, 519
- OH observations, 183, 188, 189, 207-9
- Galactic Cepheids, 606
- Galactic coordinates, 177, 207, 331
- Galactic cosmic rays, 351
 - see also Cosmic-ray density
- Galactic halo, 488, 489
 - see also Halo
- Galactic neighborhood
 - X-ray sources, 328
- Galactic nuclei
 - and quasars, 439
- Galactic plane
 - gamma-ray observations, 522
 - OH observations, 183, 189, 209
 - X-ray sources, 332, 345
- Galactic rotation, 169
- "Galactic Structure," 453
- Galaxoid theory
 - of quasars, 443
- Galaxy
 - age of, 38
 - binaries in, 25
 - formation of, 630-31
 - magnetic fields in, 167-82
 - radio background in, 200
- Galaxy clusters, 409-10, 428, 437, 445
 - formation of, 630-31, 632, 645
- Galilean satellites, 272
- Gamma radiation, 318, 481-522
 - discrete sources, 489-92
 - intensities, 484-86
 - production mechanisms, 482-84
 - Compton effect, 496-98
 - electromagnetic transitions, 498-99
 - magnetic bremsstrahlung, 496
 - matter-antimatter annihilation, 503-6
 - nuclear reactions, 325, 328, 557, 563
 - pair production, 492-93
 - radioactive decay, 499-503
 - spectra, 487-88
- Gamma-ray multiplicity, 499
- Gamow energy, 539
- Gamow-Maxwell-Boltzmann product, 540
- Gamow-Teller beta decay, 562
- Gas circulation
 - in spiral galaxies, 454, 458
- Gaseous nebulae
 - abundances, 384
 - interferometry of, 150
 - and planetary formation, 268
 - see also Nebulae
- Gas pressure
 - parameter
 - in stellar evolution, 591
- Gas turbulent velocity
 - in disk galaxies, 456
- Gates sodium lamp
 - for calibration, 155
- Gaunt factor, 340
- Gaussian error, 144, 145
- Geiger detector, 286
- General Catalog of Variable Stars, 25
- General magnetic field
 - solar, 11
- General relativity
 - cosmological implications, 633, 641, 642
 - for quasars, 441
- Geomagnetic activity
 - and coronal activity, 213, 220, 228, 245, 261-63
 - and particle flux, 360, 370, 376, 381
- Geomagnetic cutoff, 371
- Geometrical acoustic approximation, 72
- Geometrical optics, 45
- Geometry
 - of galactic magnetic fields, 179
- Geons
 - cosmological, 643
- Giant branch
 - and stellar evolution, 584, 593, 595, 603, 609, 613, 615, 621, 622, 624
 - see also Red giant
- Giant planets, 270, 272, 277
- Giant stars
 - binary, 106, 119-23
 - nuclear reactions in, 526, 564
 - stellar evolution of, 582
 - see also Supergiants
- Glasses
 - for telescope optics, 46
- Globular clusters
 - binaries, 100
 - stellar-evolution implications, 615, 618, 622, 624
- g modes
 - in rotating fluids, 474
- Grain pattern
 - of photographic plates, 90, 92
- Grains
 - interstellar, 168
 - see also Interstellar matter
- Granularity
 - of emulsions, 146
- Granulation
 - solar, 3, 5, 6, 22
 - and hydrodynamics, 68
 - see also Supergranulation
- Grating premonochromator, 153
- Gratings
 - in astronomical telescopes, 57, 59, 64-65, 89, 139
- Grating spectrograph, 281
- Gravitation
 - in binary systems, 40, 41
- Gravitational binding
 - in quasars, 444
- Gravitational collapse
 - cosmological models, 643
 - in quasars, 440, 442
 - of spiral galaxies, 453, 456, 459
- Gravitational contraction
 - in stellar evolution, 611
- Gravitational energy
 - coronal, 245
 - galactic, 169
 - of the solar nebula, 272
- Gravitational focusing
 - and quasars, 447-48
- Gravitationally induced diffusion
 - in stellar evolution, 624
- Gravitational redshifts
 - of quasars, 410-11, 427
- Gravitational resonance
 - in disk galaxies, 458
- Gravitational self-confinement, 345
- Gravitational stratification
 - of stellar atmospheres, 71
- Gravitons
 - and cosmological models, 637
- Gravity
 - effective
 - in rotating fluids, 469
- Gravity waves
 - in rotating fluids, 474
 - in stellar atmospheres, 71
- Gray atmospheres, 69
- Grazing incidence optics, 280, 284, 308, 310, 311
- Green-line features, 310
 - solar, 14
 - coronal, 221
- Gregorian system
 - of telescope optics, 48
- Grey-body temperature, 315
- Ground-level instruments
 - gamma-ray observations, 516
 - high-energy particle flux, 354
 - quasar observations, 406
- Group parallax, 106, 112-15
 - see also Cluster
- G stars, 96, 98, 106

- Guiding centers
for solar particles, 390
- Gyrofrequency
coronal, 255, 257
- Gyroradius
of interplanetary particles,
234, 375
- Gyrotropic effect
in OH regions, 205
- H
- H α , 306
photography, 145
solar, 6, 8
coronal, 238
- H γ
binary observations, 33,
34
- H δ
binary observations, 92
X rays and, 347
- Hale's law
of sunspot polarity, 14
- Hallé filter, 148
- Halo stars, 109, 119
B stars
and stellar evolution,
623
cosmological inferences,
641
emission, 336
quasars, 402, 409
- Halo structure
of quasars, 426
of spiral galaxies, 453, 454
- Hard X rays, 319
- Harmonic oscillation
in stellar atmospheres, 71
- Hartree-Fock approximation,
301
- Harvard patrol cameras
optics of, 51
- HD stars, 31, 39, 40, 97,
114, 123, 130, 137
- Heat capacity
of optical materials, 62
- Heating mechanisms
coronal, 213
of the solar nebula, 270
- Heavy elements
abundances
interstellar, 328
in quasars, 413, 416
solar, 298, 363, 382,
383
cosmological models with,
628, 632
in stellar evolution, 582
- Heavy nuclei
and gamma-ray production,
487, 500
- Helium, 283, 305
abundance
cosmological models, 628,
629, 632, 640
gamma-ray observations,
489, 490
in quasars, 413, 415
solar, 282, 283, 284, 288,
292, 306, 310
in the solar nebula, 272
in Uranus and Neptune,
276, 278
blue-star emission, 333,
347
in cosmology, 628, 632,
639, 641
lines
in binaries, 92, 98
in other stars, 155
nuclear reactions, 526, 534,
541, 542, 545, 547, 548,
554, 555, 556, 558, 564,
566, 567
-to-oxygen ratio, 384
stellar evolution, 576,
590
X-ray absorption, 327
- Helium burning, 526, 559,
563-64
in stellar evolution, 571,
573, 577-80, 583, 594,
595-96, 606, 608
- Helium flash
in stellar evolution, 595,
615, 617
- Helium nuclei
in solar-particle flux, 352,
354, 362, 376, 381, 388
see also Alpha particles
- Helmet streamers, 220, 221,
223, 225, 227, 228, 237,
241, 242
- Helmholtz instabilities, 236
- u Her, 98, 130
- He II regions, 273
- Hertzsprung gap
in stellar evolution, 593
- Hertzsprung-Russell diagram,
27, 578, 585, 590, 595,
598, 602, 606, 611, 615
binaries in, 85, 87
theoretical, 573, 598
see also Color-luminosity
relation; HR diagram
- High-dispersion observations,
2, 3, 54
- High-excitation sources,
287
- High-pass filters, 76
- High-resolution spectrometer,
139, 158, 283, 287,
306
- High-temperature stars
and quasars, 402
see also Blue stars; Early-
type stars
- H line
in binaries, 86, 99
- H β luminosity
in quasars, 413
- H $_2$ O lines
in Martian atmosphere, 139
- Homogeneity
of optical materials, 63
- Homogeneous stellar atmospheres
hydrodynamics of, 69
- Homology method, 81
- Horizontal-branch stars,
121
and quasars, 402, 403
in stellar evolution, 622,
623, 624
- Horizontal fields
solar, 8
- Horizontal wavenumber, 72,
74, 77
- Hot model
of the universe, 627-28,
635, 638, 640, 641
- "Hot" theory
of planetary formation,
271
- h Persei
and stellar evolution, 605,
609-11
- HR 906, 31
- HR 3789, 109
- H I regions, 179
OH in, 184, 189, 190, 191,
203, 206, 210
and quasars, 415
- H II regions, 140, 145, 146,
179
OH in, 183, 189, 191, 193,
199, 203, 206, 210
solar nebula as, 273
- Hubble constant, 645
- tensor, 642
- Hubble distance, 328
- Hubble expansion
cosmological, 630
- Hubble time
and quasars, 441
and stellar evolution, 617,
622, 624
- Hyades
binaries, 86, 107, 137
HR diagram, 597, 598, 599,
600, 601, 605
mass-luminosity relation,
115, 118, 123, 125,
129
- Hydrodynamical equations
for rotating masses, 465
- Hydrodynamics
of stellar atmospheres, 67-
83, 242, 243
- Hydrogen
absorption
of gamma rays, 491
abundance
cosmic-ray data, 489
blue-star emission, 333
gamma-ray observations,
489
gamma-ray production,
489
-to-helium ratio, 364

in the solar nebula, 272
 intergalactic, 438
 lines
 in binaries, 92, 94
 21 cm, 171
 see also H α ; H β ; etc.
 molecular
 in Uranus and Neptune,
 276, 277, 278
 opacity, 293, 576
 photon absorption by, 327
 in quasars, 407, 438
 solar, 292, 298
 X-ray absorption, 327
 Zeeman effect, 168
 see also H lines
 Hydrogen burning, 526
 in stellar evolution, 562,
 571, 572-77, 583, 592
 Hydrogen convection zone
 solar, 7
 Hydrogen-helium discontinuity
 in stellar evolution, 579
 Hydrogenic atoms
 cross sections, 325
 Hydrogen recombination
 in cosmological models,
 630, 645
 in quasars, 413
 lines, 191
 see also Di-electronic re-
 combination
 Hydromagnetic forces
 in spiral galaxies, 454, 456,
 459
 Hydromagnetic shock waves,
 223
 Hydrostatic equilibrium
 coronal, 247, 248, 249,
 254
 in stellar evolution, 587
 Hyperfine interactions
 in OH, 183, 204, 206
 Hyperon decay, 483, 503-4,
 508

I

IC 434
 OH in, 192
 IC 443
 OH in, 192
 IC 1318
 OH in, 192
 IC 1795
 OH in, 192, 197, 199
 IC 4701
 OH in, 192
 Identical particle factors,
 526, 529
 IGY observations, 351
 Ikeya-Seki, 245
 Image-intensifier tubes, 58,
 59-60, 65
 Image rotators, 64
 Image slicers, 61
 Image tube

binary, 89, 92
 QSO's, 403
 Imaginary spectra
 for rotating fluids, 474
 Imbedded dipole field
 of Sun, 240
 IM Mon, 29, 98
 IMP-1, 15, 352, 376,
 377
 IMP-III, 352, 365, 380
 Impulse distribution
 cosmological, 645
 Inclination
 of binary orbits, 36, 106
 Incompressible fluid
 hydrodynamics of, 72
 Jeans theory of
 and binary stars, 37
 rotating, 475
 Index Catalogue of Double
 Stars, 25
 Induced radioactivity
 and gamma-ray production,
 500
 Induced-transition rate
 nuclear, 529
 OH, 202
 Inelastic collisions
 gamma-ray, 499, 505
 nuclear, 527, 563
 stellar and QSO's, 440
 Inflection point
 stability criterion
 in rotating fluids, 475
 Infrared observations
 and OH distribution, 199
 of QSO's, 416, 417, 436,
 439
 Infrared plates, 53
 interference, 149, 159,
 161
 Infrared telescopes, 56-57
 Inhomogeneous universe, 644-
 45
 Initial composition
 stellar, 572, 575, 580, 584,
 597, 615, 617
 Injection time
 solar-particle, 391
 Injun I, 313
 Instabilities
 Cepheid, 606
 coronal, 246
 cosmological, 634
 disk galaxies, 456, 458
 plasma, 440
 rotating fluid, 468, 470,
 475-78
 rotational, 273
 thermal, 580
 Integral detectors, 352
 Integral intensity
 gamma-ray, 484, 504
 solar proton, 368, 373
 Integral mass number, 527
 Integral methods
 rotating fluids, 478

Integral photon spectrum,
 508
 Integral representations
 spiral structure, 461
 Integral spectrum, 506
 gamma-ray, 487
 Integral transmittance, 142
 Integrated emission
 X-ray, 341
 Integrated magnetic field
 solar, 20, 21
 see also General magnetic
 field
 Integration techniques
 in solar observations,
 4
 Integration times
 OH observations, 188,
 191
 Integrodifferential equations
 numerical methods, 69
 Intensity fluctuations
 in Sun, 4
 Intensity ratio
 OH lines, 189
 Interaction cross section
 neutrino, 481
 Interaction energies
 nuclear, 525
 Interaction rates
 nuclear, 527-28
 Interactions
 disk galaxies, 455
 Interference filters, 53,
 306
 Interference patterns, 146
 Interferometer
 Fabry-Perot, 139-66
 Lick Observatory, 159
 radio, 194-209, 399, 425
 in solar observations,
 3
 Intergalactic medium, 457
 and cosmology, 627, 629-
 30, 632, 641
 and gamma ray, 481, 489-
 91, 520
 and QSO's, 409, 437-38,
 443, 445
 Interior opacity
 in stellar evolution, 581,
 588, 591
 Interior temperature
 stellar evolution, 590
 Intermediate-band photometry,
 103
 Interplanetary magnetic fields,
 15, 19
 and corona, 234, 236,
 259
 and solar particles, 354,
 358, 362, 363, 371, 372,
 373, 375, 380, 389, 390,
 393, 396
 Interplanetary plasma
 and solar corona, 213, 219,
 227, 231, 233, 235, 237,

- 238, 241, 243, 272
 see also Solar system
 Interstellar magnetic fields
 and solar nebula, 273
 and stellar winds, 241
 Interstellar matter, 37
 absorption lines, 90, 94, 97,
 139, 155, 159
 galactic polarization by,
 168, 169, 170
 and gamma rays, 489, 506-
 8
 OH, 183-212
 and solar nebula, 273
 in spiral galaxies, 458
 X-ray absorption by, 326
 Interstellar polarization
 galactic, 167-69
 Intersystem transitions
 solar, 281
 Inverse Compton effect,
 322
 gamma-ray, 483, 494-96
 QSO's, 417, 419, 420, 434,
 439
 X-ray, 337, 338, 339
 Inversion
 of populations
 in OH, 189, 200, 201,
 204
 Inviscid flow
 in disk galaxies, 456
 "Invisible sunspots," 4
 Iodine lines, 155
 scans, 155
 Ion chambers
 shielded, 351
 Ionic tails
 of comets, 240, 241
 Ionization
 solar nebula, 271, 272
 stellar atmospheres, 71
 Ionization chamber
 solar-particle, 354, 370
 Ionization cross section
 coronal, 247
 Ionization equilibrium, 296,
 300
 Ionization fronts
 in H II regions, 202, 203
 Ionization potential
 solar elements, 283
 Ionization temperature
 coronal, 247
 Ion kinetic temperature
 coronal, 249
 Ionosonde observations, 354
 Ionospheric disturbance, 315
 and solar particles, 354
 and X rays, 325
 Iron
 as optical material, 63
 in quasars, 407
 solar, 281, 283, 285, 286,
 287, 289, 290, 291, 292,
 297, 298, 299, 301, 306,
 308, 311, 318
 coronal, 238
 X-ray absorption, 327,
 341
 Iron group elements
 in solar corona, 213
 Iron group nuclei, 565
 IR radiation
 OH, 205, 206
 Irreversibility
 thermodynamic, 82
 Isoelectronic sequences, 288,
 290, 291
 Isogauss lines
 in Sun, 6, 7, 13
 Isothermal atmosphere, 68,
 72-73, 77-78
 Isothermal plasma, 341
 Isothermal shock waves
 in disk galaxies, 461
 Isotope abundances, 139
 OH, 206
 solar-particle, 363
 Isotropic diffusion model
 solar-particle, 396
 J
 Jacobi ellipsoid
 in rotating fluids, 468, 469,
 476
 in spiral galaxy theory,
 454
 Jeans instability
 rotating fluids, 476
 Jeans mass, 643, 644,
 646
 Jeans wavelength, 631
 Jet
 in 3C 273, 399
 in 3C 275.1, 429
 and cosmology, 632
 theories of, 444
 Johannesburg refractor,
 105
 Joule heating
 in stellar atmospheres, 71
 Jovian satellites, 272
 Jupiter, 267, 270, 273
 orbital angular momentum,
 274
 period of, 274
 JWKB method, 78, 79
 K
 Kanogen coating
 for astronomical optics,
 83
 K corona, 216
 K-coronameter, 223, 224,
 228, 238, 241
 K correction
 for QSO's, 419, 428,
 431
 Kelvin frequency
 rotating fluids, 476
 Kelvin modes
 for rotating fluid, 473-
 74
 Kepler's law
 planetary orbits, 273, 277
 third, 40
 Kinematical properties
 stellar atmospheres, 69,
 72
 Kinematic viscosity
 and the solar corona, 246
 Kinetic temperatures
 coronal, 247, 249
 OH, 206
 solar nebula, 274
 Kitt Peak Observatory and
 QSO's, 402, 403,
 409
 Klein-Nishina formula, 482,
 497
 K line
 absorption
 interstellar, 155, 162
 emission
 in binaries, 86, 99
 coronal, 232, 306
 solar, 4, 6, 10
 K mesons
 decay, 503-4
 production, 482, 483
 Knock-on collisions, 337
 KO Aquilae, 41
 Kronecker delta, 527
 K-shell
 gamma rays, 492
 ionization, 322
 X rays, 341
 K₃-spectrohellograms, 223,
 229
 K stars
 in binaries, 28, 29, 97, 98,
 106
 L
 L 6, 334
 L 7, 334
 Laboratory system
 p-p reaction, 504, 527, 544,
 550
 I Lacerta, 37
 Lac X-1, 334
 Lallemand tube, 58
 Lambda doubling
 in OH, 183-84, 202-3, 206-
 7
 Lamb's resonance
 in isothermal atmospheres,
 77-78
 Laplacian density profile,
 72
 Laplacian disk
 solar nebula, 276, 277
 Large Magellanic Cloud
 Cepheids in, 607
 Large-scale magnetic fields
 solar, 3, 11-19
 Larmor radius, 339

- Late-type stars, 96
 in binaries, 112, 119-23
 and planetary formation, 268
 Lead
 gamma-ray absorption, 491, 512, 514, 517
 Lead collimation
 gamma-ray detectors, 518
 Lead glass
 gamma-ray detection, 514, 515
 Leading spirals, 457
 Least squares, 95, 553, 560
 nuclear cross sections, 536, 538
 Legendre expansion, 177
 in dynamics of disk galaxies, 455
 Lens optics, 42
 γ Leo, 106
 Leo X-1, 334
 Leptons, 532
 and gamma rays, 482, 483
 Level population
 in OH, 186, 187
 Lichtenstein's theorem, 466
 Lifetimes
 multiple systems, 38
 nuclear, 525, 527, 529
 planetary formation, 268, 271
 stellar, 582, 586, 610, 623
 of structures
 on Sun, 9, 10, 17
 X-ray source, 335
 Light-curves
 binary, 25, 27, 85, 88, 92
 QSO's, 420
 supernova, 500
 Light elements
 in stellar evolution, 575
 Light grasp, 143
 Li^6/Li^7 ratio, 139
 Limb
 solar
 fields, 8
 Limb brightening, 217, 280, 283, 293, 294, 308
 Limb darkening, 280, 308
 Limb-to-disk intensity ratio
 solar, 283
 Limb spectrum, 281
 Limiting magnitude
 for astronomical photography, 53
 Limiting mass
 for rotating fluid, 472
 Limiting period
 of asteroids, 273
 for binary stars, 29
 Linblad resonance, 457
 Linear filtering, 76, 77
 Linearization
 for rotating fluids, 476
 Linearized equations
 of hydrodynamics, 68
 Linear polarization
 of OH, 193, 203
 Line blending, 39, 90
 Line broadening
 in binaries, 33
 Line doubling
 in binaries, 90
 Line formation
 solar, 297, 299
 see also particular lines
 Line narrowing
 in OH, 201
 Line pairs, 290
 Line profiles
 binary, 33
 solar, 4
 Lines of force
 in binaries, 39
 solar, 9, 10
 Linewidth
 of spectral lines
 in W Ursae Majoris systems, 39
 Linewidth-luminosity relation, 87
 Liquid coolant
 for telescopes, 56
 Lithium, 541, 542, 543, 545, 546, 547, 563, 565, 566, 567
 nuclear reactions, 534
 solar, 282, 383
 Littrow spectrograph, 154
 Local association, 116
 Local galactic cluster
 and gamma rays, 490
 Local gravitational acceleration
 in solar corona, 243
 Locally inertial frame
 in cosmology, 634
 Local spiral arm, 179
 OH in, 191
 Local supercluster
 of galaxies
 and gamma rays, 490
 Local thermodynamic equilibrium
 coronal, 247
 Long base-line interferometry, 425, 426
 Longitudinal fields
 galactic, 171, 193
 Longitudinal temperature
 corona, 251
 Longitudinal waves, 83
 Longitudinal Zeeman effect, 148
 Long-period systems, 35, 96
 Long-range interaction
 disk galaxies, 455, 459
 Loop prominences
 and solar corona, 225, 228, 253
 and X rays, 386
 Loops
 magnetic field
 in corona, 228, 237, 253
 in Sun, 8, 14
 Lorentz profile, 142
 Lorentz transformation
 in cosmology, 634
 Low-dispersion spectrograph, 62
 L shell
 X rays, 341
 Luminosities
 of binaries, 28, 41, 111
 and stellar evolution, 574
 Luminosity class V
 binaries, 30
 Luminosity distance
 of QSO's, 413
 Luminosity function, 37
 Luminous efficiency, 143
 Lunar occultation
 Crab Nebula, 333
 QSO's, 401, 425, 426
 Lunar probes, 482, 517
 Lyman α
 cosmological observations, 646
 in OH observations, 203
 in QSO's, 409, 413, 416, 437
 solar, 284
 Lyman β
 solar, 284, 305
 Lyman series
 solar, 284
 QSO's, 416
 Lyot filter, 148
 β Lyrae systems, 27, 29

M

 M stars
 binary stars in M67, 106, 119, 121
 Cepheids in M31, 607
 cluster locus in M92, 614, 615, 618
 gamma rays, 510, 521
 OH in, 187, 188, 192, 208
 stellar evolution, 611, 612, 623
 Mach number, 68
 Mach's principle
 and cosmology, 633-35
 Maclaurin pattern, 468-69, 470
 Maclaurin series, 539
 partial-wave expansion, 533
 Maclaurin spheroids, 468, 469, 473, 475

- Magellanic Clouds
 - and dynamics of galaxy, 457
 - OH in, 209
 - stellar evolution in, 607
- Magnesium, 294, 383, 559, 560, 561, 565, 568
 - nuclear reactions, 526
 - in QSO's, 400, 403, 407, 409, 414, 415, 416, 421, 422, 424, 437
 - solar, 285, 286, 287, 292, 293, 296, 297, 298, 306, 308
- X-ray absorption, 327
- Magnetic bottles
 - of Sun, 240
- Magnetic bremsstrahlung and gamma rays, 483, 486
 - and X rays, 337
- Magnetic bundles
 - in interplanetary space, 234
- Magnetic cosmological solutions, 631-32, 641-43
- Magnetic coupling, 276
- Magnetic dipole moment
 - of Sun and corona, 220, 232
 - superstars and QSO's, 444
 - transitions
 - OH, 184
- Magnetic fields
 - in corona, 253-61
 - and mass loss
 - in binaries, 39
 - observations
 - galactic, 167-82
 - solar, 1-24, 213
 - in QSO's, 442-45
- Magnetic fronts
 - and solar-particle acceleration, 388
- Magnetic moments
 - in solar nebula, 272
- Magnetic plasma
 - and X-ray emission, 329
- Magnetic pressure
 - corona, 258
- Magnetic rigidity, 393
- Magnetic shields
 - in astronomical telescopes, 58
- Magnetic stars
 - and stellar evolution, 603
 - Sun as, 1, 20-22
- Magnetic storm, 11, 261, 356, 360, 365, 376
- Magnetic torque transmission
 - solar nebula, 276
- Magnetograph
 - solar, 1, 26
- Magnetohydrodynamic models of stellar atmospheres, 67
- Magnetohydrodynamic waves
 - interplanetary, 375
 - solar nebula, 271, 278
 - on solar surface, 3, 213
- Magnetoid theory
 - of QSO's, 444
- Magnetotonic resonance
 - coronal, 248, 255
- Magnetosphere
 - and solar corona, 213, 234
 - and solar particles, 351
- Magnetostrictive transducers, 163
- Magnetoturbulence
 - galactic fields, 173
 - QSO's, 443
- Main-sequence stars
 - binary, 25, 28, 29, 41, 85, 96, 107, 111, 115
 - and cosmology, 630
 - evolution, 571-624
 - and QSO's, 400
- Manganese
 - solar, 290, 292
- Mariner II observations
 - coronal, 219, 233, 235, 263
 - solar, 352
- Mariner IV, 352, 365, 367, 380, 381
- Mars, 267, 270, 272, 273
 - atmosphere of, 139
- Martian satellites, 272
- Maser effects
 - in H in galaxy, 454
 - in OH, 172, 191, 200-6, 209
- Mass absorption coefficient
 - gamma-ray, 491
- Mass determinations
 - binary, 26, 41, 42
 - eclipsing binaries, 85-103
- Mass ejection
 - along magnetic lines, 38
- Mass fraction
 - parameter
 - in stellar evolution, 572, 574, 575, 576, 586
- Mass function
 - binary-star, 98-99
- Mass loss, 345, 571, 605, 623
 - rotating fluid, 472
 - see also Be stars; Solar wind
- Mass-luminosity relation, 27
 - binaries, 86, 87, 115, 116, 123, 125
 - in stellar evolution, 586, 587, 588, 593, 597, 600
- Mass number
 - integral, 527
- Mass parameter, 106
- Mass ratio
 - for binaries, 27, 40
- Mass transfer
 - in binaries, 36, 39
- Mathewson's Belt, 175, 179
- Matter-antimatter annihilation and gamma rays, 482, 483, 504-6
 - and QSO's, 446-47
- Maximum
 - solar, 19
- Maxwell-Boltzmann distribution
 - of particle velocities, 498, 532
- Maxwellian distribution
 - X-ray, 340
- Mean annihilation time
 - positron, 505, 506
- Mean cluster locus
 - stellar evolution, 608, 609
- Mean error
 - in orbit determination
 - for binaries, 33, 34
- Mean free path
 - X-ray, 328, 340
- Mean molecular weight, 587
- Mechanical resonance
 - hydrodynamic, 78
 - in stellar atmospheres, 69
- Meniscus
 - in telescope optics, 48
- Mercury, 267, 272, 276
- Meson detectors, 517
- Meson multiplicity function, 502
- Mesons
 - and cosmology, 637
 - decay, 500-3, 506, 507, 509, 521
 - production, 347
 - and gamma rays, 481, 482, 483, 486
 - and QSO's, 446
- Metagalaxy
 - and gamma rays, 489, 490, 494, 504, 505, 520
 - specific photon intensity, 336
- Metal-deficient stars
 - and quasars, 402
 - and subdwarfs, 615, 617
- Metallic absorption
 - solar, 295
- Metallic-line stars
 - binary, 30, 97
- Metallurgical process
 - solar nebula, 278
- Metal mirrors
 - in astrophysics, 63
- Metal-rich stars
 - evolution of, 584, 585, 588
- Meteorites
 - information from, 481

- Method of residues, 80
Metric
 spatial
 and cosmology, 646
MHD modes, 67
Mica
 as polarizer, 148
Michelson interferometer,
 143, 159
Microevents
 solar, 381
Microphotometer tracing
 binary, 88
 solar corona, 216
Microscopic defects
 optical, 144
Microwave emission
 coronal, 248, 255,
 313
 gamma-ray, 490, 494
 QSO's, 434
 X-ray observations, 335,
 337
Microwave lines
 OH, 183
Microwave saturation, 205
Migration of solar fields, 12,
 231
 see also Drift
Milky Way observations
 optical, 53
 see also Galaxy
Millstone Agassiz interferom-
 eter, 194, 199
Mirror coating
 dielectric, 140
 see also Metal mirrors
Mirror reactions, 538
Mixing
 convective
 in stellar evolution, 576
Mixing length
 and stellar evolution, 572,
 582, 588, 617
 turbulent, 275
MK system, 32
ML plane
 see Mass-luminosity rela-
 tion
MM Her, 99
Model atmospheres, 615
Modulation-collimator
 X-ray observations, 333,
 348
Molecular dissociation
 stellar atmospheres, 71
Molecular weight
 parameter
 in stellar evolution, 587,
 590
Moment of inertia
 and stellar evolution, 603
Momentum balance
 in spiral galaxies, 454
Momentum exchange reactions
 stellar atmospheres,
 71
Monopole transitions, 563,
 564
Moon, 272
Moons
 irregular, 268
 of planets, 267
Mount Wilson interferometer,
 159
Moving cluster parallax, 86,
 87
M regions, 17, 261, 380
MSH 03-19, 404, 408
MSH 04-12, 408
MSH 13-011, 405, 408
MSH 14-121, 401, 406,
 408
MSH 16+03, 406
M stars
 in binaries, 29, 96
Multichannel interferometers,
 152
Multilobed interferometer
 coronal, 222
Multiple-pion production
 of gamma rays, 501
Multiple-scattering theory, 218
Multiple-scattering experi-
 ments
 gamma-ray, 513
Multiple sources
 QSO's, 426
Multiple systems, 114,
 130
Multiplet structure, 290
Multiplicity
 gamma-ray, 499, 505
 meson, 502
 pion, 500
Multipolar regions
 solar, 11, 18
Muon production
 and QSO's, 447
MY Cyg, 97
- N
- Nai detectors, 512
 gamma-ray, 513, 514,
 518
Narrow-band photometry,
 103, 306
National Geographic Society
 Palomar Sky Survey, 52
Nebula
 galactic polarization, 168
 interferometry of, 143, 150
 XUV spectroscopy, 292
Nebular emission, 162
 in QSO, 403
 see also Calcium
Negative energy field
 in QSO's, 441
Neon, 286, 298, 409, 412,
 543, 548, 549, 559, 580,
 563, 568
 isoelectronic sequence
 solar, 291
nuclear reactions, 526,
 535, 543
QSO, 407, 415
 solar, 285, 292, 341
 X-ray absorption, 327, 352,
 383
Neon-to-oxygen ratio, 384
Neptune, 267, 270, 273, 276,
 278
Networks
 of fields on Sun, 11
Neutral atom, 71
Neutral density waves
 in disk galaxies, 456, 457
Neutral mode
 rotating fluid, 477
Neutral point
 in solar magnetic field, 8
Neutrino processes, 609
 stellar evolution, 571
 see also Photoneutrinos
Neutrinos, 532, 563
 and cosmology, 627, 632,
 633
 detection, 481, 563
Neutron capture, 500
 and cosmology, 628
 and gamma-ray production,
 499
Neutron flux
 solar, 387
Neutron-induced reactions,
 535
Neutron monitor observations,
 351, 354, 355, 358, 359,
 370, 373, 390
Neutron resonant reactions,
 545, 567
Neutron star
 critical mass, 440
 X-ray, 397
Newtonian focus of telescope,
 50, 51
Newtonian gravitation, 440
Newtonian singularity
 cosmological, 643
Newton's cooling law, 69
Newton's law of radiation, 74
NGC clusters, 119, 121, 151,
 332, 417, 423, 425, 427,
 433, 435
 HR diagrams, 597, 598, 599
OH in, 187, 188, 189, 190,
 192, 193, 195, 196, 197,
 198, 199, 200, 208
QSO, 429
 stellar evolution, 607-9,
 611, 612
Nickel, 287
 electronic transitions
 solar, 292, 298, 301
Nickel-phosphorus
 in optical materials, 63
Nilvar
 in interferometry,
 163
Nitrogen, 152, 282, 284, 286,

287, 347, 383, 542, 543,
545, 548, 549, 552, 553,
554, 555, 556, 563, 567
blue-star, 333
and cosmic gamma-ray
production, 499
nuclear reactions, 535, 542
QSO, 407
solar, 279, 283, 292, 298,
299
stellar, 572, 574, 577, 593
X-ray absorption, 327
Nitrogen flash, 595
Nodal passage
in binaries, 95
Nodes
line of, 106
Noise
and astronomical optics, 56
radio-solar
see Bursts
turbulent, 68
Nonaxisymmetric modes
disk galaxies, 456
rotating fluids, 470
Nondegenerate reaction rates
nuclear, 525-70
Nondissipative motions
in stellar atmospheres, 69
Non-Euclidian geometry
in cosmology, 641
Nonflare X rays, 313-15
Nonisothermal model
stellar atmospheres, 79-81
Nonisotropic stellar atmos-
pheres
hydrogen, 69
Nonlinear differential equa-
tions
of rotating fluids, 467
Nonlinear effects in dynamics
of disk galaxies, 460, 461
Nonlinear equations
of hydrodynamics, 68
Nonpropagating modes, 73,
79
Nonrelativistic reaction rates
nuclear, 525-70
Nonresonant cross sections
charged-particle, 538-40
neutron, 533-38
Nonresonant neutron rela-
tions, 537
Nonresonant reactions, 557
nuclear, 540-43
Nonspherical grains
interstellar, 169
Nonthermal radio emission,
168, 170
from OH, 189
QSO's, 417, 419
Nonuniform fluids, 82
Nonuniformity
rotating fluid, 471
Nonvariable stars
wave motion in, 67-83
Normal Galactic spur, 177-79

Normal incidence optics, 280,
306
Normal mode analyses
rotating fluid, 477
Normal modes
of inviscid flow, 456, 457
North Pole
solar, 19
Novae
and binary systems, 30, 100
hydrodynamics of, 81
QSO's, 400
X-ray sources, 332, 333,
335, 345
NRAO sources, 423
Nuclear charge
effective, 492
Nuclear de-excitation, 483,
498-99, 500, 511
Nuclear energy generation
in rotating fluids, 466
Nuclear interaction radii, 527
Nuclear lifetimes, 525
Nuclear lines
X-ray, 337
Nuclear notation, 526
Nuclear reactions
in cosmology, 628-29, 633,
638-41
rates, 525-70
Nuclear spectroscopy, 564
Nuclear synthesis, 526
Nuclei
cosmic-ray, 170
solar, 382-84
Nucleons
in gamma-ray production,
482, 487
Nucleosynthesis
in QSO's, 446
Numerical methods, 81
high-energy nuclear, 553
hydrodynamic solutions,
465, 470-72
integrodifferential equations,
69

O
O associations, 179
Objective grating imaging, 307
Objective prism techniques,
57
Oblate spheroidal coordinates
in disk galaxies, 455
Observational selection
of binaries, 25, 29, 30, 37
OH observations, 184, 191
Occultation techniques
for coronal probing, 213,
217-19, 232, 234
QSO's, 401
for X-ray sources, 333
Occupancy
of fine structure
in QSO's, 410
OGO-I, 380

OH
absorption
interstellar, 139
emission, 189-206
galactic polarization ob-
servations, 168, 172
interstellar, 183-212
see also Maser
Old stars
binary, 119
in QSO's, 400, 402
Opacity
stellar evolution, 579, 587,
590, 594, 597
Open universe, 629, 635
70 Oph, 105
ζ Oph, 157
ν Oph, 31
Oph X-1, 334
Optical depth
anomalous, 189
in OH, 188, 209
Optical model, 499
Optical observations
coronal, 216, 224, 225, 232
Optical polarization
convention, 193
galactic, 167-69
Optical retardation, 143
Orbital angular momentum
and binaries, 39, 40
nuclear, 550
see also Angular momentum
Orbital eccentricity
for binaries, 40
Orbital elements
binary, 25, 27, 28, 31, 32,
34, 43, 87, 88, 105,
106-9
Orbital inclination, 106, 107
Orbital periods
of binaries, 30, 31, 36, 88
see also Period
Orbital synchronism
in binaries, 36
Orbits
planetary, 268
Order
of interference, 142, 146
Origins
of binary systems, 36, 37-
42
Ori A
OH in, 192, 193, 198, 199,
200
I Orionis, 37
Orion Nebula, 145
ORS-3, 335
Oscillating models
cosmological, 633
Oscillations
coronal, 238-41
rotating fluid, 472-78
stellar atmospheres, 71
Oscillator strength, 297
Oscilloscope measuring
for binary work, 33, 34

- Oscilloscope scanning comparators, 88
 OSO-I, 279, 290
 gamma-ray observations from, 518
 O stars
 in binary systems, 29
 see also Early-type stars;
 Stellar evolution
 Oxygen, 542, 543, 548, 549,
 552, 558, 559, 563, 564,
 565, 593
 emission in blue stars, 333,
 347
 in gamma rays, 499, 511
 nuclear reactions, 526, 535,
 542
 and OH observations, 202
 in planetary nebula, 150
 in QSO's, 407, 414, 415
 solar, 281, 283, 284, 285,
 286, 290, 292, 298, 299,
 300, 306, 352, 383
 solar abundance, 282, 284
 stellar evolution, 574, 577,
 584
 Oxygen burning, 564
 see also Nuclear reactions
- P**
- Pair-annihilation
 processes in stellar evolu-
 tion, 610
 Pair-production
 gamma-ray, 490, 491, 492-
 94, 511, 516
 nuclear, 564
 Palomar Sky Survey, 52, 197
 QSO's, 401, 421, 428, 433
 Panchromatic plates, 45
 Parabolic mirrors
 in gamma-ray detectors, 516
 Parabolic profile
 for temperature, 80
 Paraboloid telescope, 45, 49
 Paraboloidal mirror, 308
 Parallaxes
 and astronomical optics, 55
 of binary stars, 42, 85, 106,
 107
 see also Trigonometric;
 Spectroscopic
 Parallel-flow theory
 rotating fluids, 475
 Paramagnetic permeability,
 169
 Parametrization
 binary orbits, 27, 28
 Parity, 545
 conservation of, 550, 552
 Parkes survey, 172, 180, 194,
 207
 QSO's, 399, 401, 426, 430
 Partial-wave theory, 533,
 536, 551
 Partial width, 563
 neutron, 550
 Particle bursts
 solar, 351-97
 see also Bursts
 Particle identity
 nuclear reactions, 529
 Particle rigidity, 387, 391
 Particle showers, 516, 517
 Partition functions
 nuclear reactions, 529
 Paschen series
 in QSO's, 416
 Patrol instruments, 46
 Pattern speed
 in spiral galaxies, 461
 PD multiplet, 290
 Peak transmittance, 143, 145,
 154
 Peculiar binaries, 99
 Peculiar galaxies
 and QSO's, 429, 433, 436
 Peculiar motion
 solar, 427
 stellar
 in galactic nuclei, 453
 Peg, 90
 Penetrability
 of gamma radiation, 481
 Penetration factor
 nuclear reactions, 551
 Penumbral regions
 of sunspots, 8
 pep process, 562
 β Per, 88
 Perfect fluid
 Schwarzschild solution for,
 411
 Perfectly transmitting
 boundary, 391
 Periastron
 for binaries, 27
 passage, 107
 Period-color relation, 28,
 29, 41
 Period-eccentricity relation,
 38
 Period-luminosity relation
 stellar evolution, 606
 Periods
 of binary stars, 28, 107,
 109-11
 Period-semi-major axis
 relation
 in binary orbits, 105
 Permeability
 paramagnetic, 169
 α Persei cluster, 32, 33
 χ Persei
 and stellar evolution, 605,
 609-11
 II Perseus, 37
 Perturbations
 cosmological, 643
 isothermal
 stellar atmospheres, 78
 Perturbation theory
 in rotating fluids, 472
 Phase
 surface of constant, 73
 Phase coherence
 of wave motion
 of stellar atmospheres, 67
 Phase-sensitive amplifiers,
 164
 Phase space
 and disk galaxies, 455
 ζ Phe, 100
 PHL QSO's, 404, 406, 407,
 408, 410, 414, 419, 520
 Phosphors
 in astronomical optics, 58,
 60-61
 Phosphorus
 nuclear reactions, 561
 solar, 292, 298, 383
 Photocathode efficiency, 61
 Photodisintegration processes,
 526, 530, 536
 Photodissociation
 of complex nuclei, 628
 Photoelectric effect
 in gamma rays, 490, 491-92,
 511
 Photoelectric magnetographs
 see Photoelectric photometers
 Photoelectric method
 of observation, 20
 solar, 232
 Photoelectric photometer, 2
 and binary stars, 42
 Photoelectric recording, 284
 Photoexcitation
 nuclear, 529
 Photographic cancelation tech-
 niques
 in solar observations, 3
 Photographic techniques
 optics for, 45-66
 for solar observations, 1
 Photoionization continua, 293
 Photometers, 53
 Photometric parallax, 86, 107,
 108, 111, 112, 113, 118,
 120, 124
 Photometry
 coronal, 215-17, 225, 231
 Photomultiplier tubes, 61
 in gamma-ray detectors,
 514
 Photon-counting technique, 61
 Photoneutrino loss processes
 in stellar evolution, 579,
 610
 Photon-noise
 limiting, 160
 Photon-photon collisions, 328,
 493
 Photonic nuclear reactions, 504
 Photopion reaction, 509, 522
 Photoproduction
 of α particles, 564
 Photosphere
 and corona, 216, 236, 299

- dynamics, 67, 69, 80
particle flux, 352, 383
solar, 6, 10
Photospheric opacity
in stellar evolution, 579
Physicochemical process
in the solar nebula, 277
Piezo-electric transducers,
163
"Pile" theory
of QSO's, 441
Pinhole camera imaging, 308
Pioneer VI
coronal observations, 234
solar particles, 371
Pion production
and γ rays, 483, 485, 500
and QSO's, 447
Piston motions
in stellar atmospheres,
68
Pitch-angle observations
of interplanetary magnetic
fields, 371, 390, 396
PKS QSO's, 404, 405, 406,
408, 409, 410, 414,
436, 437
Plage areas
and corona, 217, 221, 223,
227, 228, 248, 263, 305,
308, 313
of Sun, 1, 6, 7, 9
waves in, 67
Plagettes, 6, 7
Planck spectrum, 338
cosmic background, 635-37
see also Black body
Plane-polarized light
in birefringent interferom-
eter, 148
Plane-stratified atmosphere
stellar, 68
Planet
missing, 273
Planetary atmospheres, 139
gamma rays in, 511
Planetary nebulae, 150
interferometry of, 151
QSO's, 407, 412
Plasma electrons
in UV pump, 205
Plasma frequency
coronal, 223, 224, 247
Plasma instability
supernova and QSO's, 440
Plasma loss processes
in stellar evolution, 579
Plasma-neutrino process
in stellar evolution, 595
Plasma oscillations, 222
coherent in QSO's, 419,
420, 440
Plasma stream
of solar particles, 378
Plasma transfer, 345
Plastic scintillator
in gamma-ray detector,
513, 514, 517, 518
Plate error, 94
Plate glass
as optical material, 63
Plate holders
for astronomical telescopes,
52
Pleiades
HR diagram, 597, 598, 599
Pleiades-Hyades
main-sequence, 107, 111,
115-16, 117, 130
Plume zone, 228
Pluto, 272
P modes
in rotating fluid, 474
Poincare's estimate, 466, 469
Point of bifurcation, 468, 469
Point-by-point method
in solar observations, 3
Point sources
X-ray, 338, 347, 494
Poisson's equation
and spiral galaxies, 461
Polar-cap absorption events,
355
Polar densities
of Sun and corona, 215
Polar faculae, 7, 19, 229,
230, 238, 239
Polarimeter
solar, 253-54
and solar corona, 215
Polarity
solar, 1, 6
magnetic, 227, 253
Polarization
galactic interstellar, 167
OH, 193
in QSO's, 419
radio, 345
of sunlight, 2
X-ray, 337
see also various types
Polarization brightness, 173
Polarization convention, 193
Polarization parameters
of OH sources, 193
Polarized light
in interferometry, 148
Polar magnetic field
of Sun, 1, 3, 6, 19-20, 229
Polar plumes, 220, 221, 223,
225, 229, 230, 236, 237,
242, 243, 253, 258
Polar spicules, 229
Poleward migration, 231
Polytropes
rotating, 470
Polytropic gas
equation of motion, 246
Polytropic index, 470
Population I
abundances in QSO's, 412,
413
disk galaxies, 458
stars
evolution of, 571, 572-
613
Population II
in disk galaxies, 458
stars, 100, 119
evolution of, 613-24
Population inversion
of OH, 189, 200, 201, 204
Populations
of levels
in OH, 186, 187
Positron annihilation, 505,
507, 509, 511, 528
Positron leakage, 508
Potassium
nuclear reaction, 561
solar, 292
Potential theory
predictions for solar fields, 8
and solar field, 254, 256
Power-law decay, 360, 394
Power-law reaction rates,
525
Power-law spectrum, 339,
341
of cosmological solutions, 642
gamma-ray, 485
of QSO's, 418
Power spectra
of Doppler shifts
of Fraunhofer lines, 74, 75
pp annihilation
and QSO's, 447
pp reactions, 503, 509
in stellar evolution, 587, 591
see also Proton-Proton re-
actions
Precession
free
of galaxy, 457
Preflare spectrum, 316
P-p relationship, 466
see also Equation of state
Pre-main-sequence contrac-
tion, 37, 571, 611
Premonochromator grating,
153-57
Pressure balance
in stellar evolution, 590
Pressure equilibrium
in the corona, 256
Pressure force
of cosmic rays, 170
in hydrodynamics
of disk galaxies, 459
in stellar atmospheres,
71
Pressure-frequency spectrum,
78
Pressure scale height
in stellar evolution, 617
Pressure scanning
in a Fabry-Perot interfer-
ometer, 155, 159
Pressure waves
in stellar atmospheres, 68
Prestellar matter, 641

- and cosmology, 632
 - Primary condensation
 - in the solar nebula, 270
 - Primary particle flux, 354, 378, 481, 486, 487, 488, 506, 508, 516
 - Primeval matter, 628, 629, 630
 - Primordial radiation, 200
 - Prisms
 - in astronomical optics, 57, 64-65
 - Production mechanics
 - for gamma rays, 482-83
 - Progressive modes, 73, 76
 - Projected orbit, 106
 - Projection-measuring devices
 - for binary stars, 88
 - Projection microscope, 33
 - Prominence
 - lines, 254
 - Prominences, 8
 - and the corona, 223, 225, 229, 231, 237, 253
 - and emission lines, 2, 308
 - Propagation effect, 362
 - Propagation modes, 72
 - Propagation of structures
 - on Sun, 9, 17
 - Propane
 - in interferometry, 162
 - Protogalaxy
 - QSO's, 443
 - Proton-alpha-particle reaction, 503
 - Proton-antiproton annihilation, 505
 - and production of gamma rays, 483
 - Proton bremsstrahlung, 498
 - see also Collisional bremsstrahlung; Bremsstrahlung
 - Proton detection, 381
 - Proton-electron collisions
 - coronal, 250
 - Proton events, 352, 369
 - 376, 390
 - Proton-to-helium ratio, 362, 363, 366, 384
 - Proton-induced reactions, 538
 - Proton-proton chain, 526, 562-63
 - Proton-proton reaction, 500-3, 506
 - Protons
 - cosmic-ray, 170
 - nuclear reactions, 525
 - Proton temperature
 - of the corona, 251
 - Protoplanets, 268
 - Protostars
 - and binary systems, 37, 40
 - and OH observations, 203, 206
 - see also Solar system
 - Protosun, 272, 276
 - Pulsation
 - of fluid
 - radial, 473
 - stellar evolution, 606, 621, 623, 624
 - Pulsation frequency
 - of stellar atmospheres, 72
 - Pulse counting
 - electronic, 140
 - Pumping efficiency
 - UV pump, 209
 - Pumping mechanisms
 - for maser action, 200, 201, 202-6
 - P-wave interaction, 536
 - PW Her, 97
 - Pyrex as optical material, 62, 63
 - Pyroceram as optical material, 62, 63
- Q**
- Quadrupole moment
 - solar
 - and cosmology, 646
 - Quantization
 - of theory of relativity, 634
 - Quantum defect method, 295
 - Quantum detectors, 140
 - Quantum efficiency
 - in interferometry, 157
 - of photographic plate, 53, 58
 - Quantum-state transitions
 - gamma-ray production, 482-83, 489
 - Quantum theory
 - and cosmology, 633
 - Quarks, 287
 - and cosmology, 628, 633, 637, 638
 - as QSO energy source, 446
 - Quartz
 - in astronomical optics, 53, 161
 - in prisms, 155
 - Quasars
 - and cosmology, 629, 630, 632
 - see also Quasi-stellar objects
 - Quasi-periodic motion
 - of the interplanetary field, 375, 376
 - of the solar corona, 238
 - Quasi-stationary spiral structure, 458
 - Quasi-stellar objects, 399-452
 - continuum, 416-20
 - cosmological, 433-37
 - energy generation, 438-47
 - gamma rays, 494, 509
 - gravitational focusing, 447
 - intergalactic medium, 437-38
 - line spectra, 403-16
 - matter, antimatter, 446-47
 - radio, 422-23
 - radio properties, 424-28
 - redshift-apparent magnitude relation, 430
 - redshifts, 410-16
 - spatial distribution, 428-30
 - stellar collisions, 441
 - supernova, 440-41
 - superstars, 441-42
 - variations, 420-24
 - Quasi-thermal X rays, 314, 316
 - Quiet Sun, 1
 - corona, 247
 - QSSS hypothesis, 459
- R**
- Radar probing, 231, 243, 247
 - solar corona, 213
 - Radial pulsation
 - of rotating fluid, 473
 - stellar evolution, 591, 606
 - Radial velocity observations, 30, 31
 - of binary stars, 25, 88, 113, 118, 121, 124
 - OH, 145, 184, 207
 - optical, 57
 - Radiance
 - coronal, 216, 217
 - see also Coronal radiance
 - Radiance response, 143
 - Radiation-belt studies, 351
 - Radiation collector, 56
 - Radiation-monitoring satellites, 314
 - Radiation pressure
 - and cosmology, 630, 643
 - solar corona, 241
 - stellar evolution, 587, 591
 - Radiative capture rates
 - nuclear, 526, 530, 564
 - Radiative core
 - stellar
 - and binaries, 39
 - Radiative damping
 - in stellar atmospheres, 71, 73
 - Radiative diffusion, 587
 - Radiative equilibrium
 - in rotating fluids, 466
 - Radiative excitation mechanisms, 188
 - Radiative opacity
 - in stellar evolution, 576
 - Radiative recombination, 296, 297, 318
 - X-ray, 340
 - Radiative relaxation, 70, 74
 - Radiative smoothing, 69-70
 - Radiative transfer
 - in stellar atmospheres, 69

- and stellar evolution, 579
- Radiative width, 325, 338, 341
- Radioactive decay
 - gamma-ray production, 500-4
- Radioactivity
 - of photographic material, 64
- β radioactivity, 482
- Radio astronomy
 - of corona, 213
 - of the galaxy
 - polarization, 167, 172-79
 - see also Bursts
- Radio bursts, 519
- see also Bursts
- Radio flux
 - redshift correlation
 - QSO's, 430
- Radio galaxies, 424
- see also Quasi-stellar objects
- Radio heliograms, 223
- Radio luminosity
 - QSO's, 427
- Radio noise, 351
- and gamma-ray observations, 488
- see also Noise
- Radio-polarization convention, 193
- Radio-quiet quasi-stellar objects, 399, 402, 407
- Radio scintillation
 - and corona, 231
- Radio sources
 - OH, 190
 - see also Galaxy; Quasi-stellar objects
- Radius
 - stellar
 - evolution of, 574, 591
- Radius of curvature
 - particle orbit, 387
- Radius of interaction
 - nuclear reaction, 539
- Radius of rigid rotation
 - of Sun, 241
- Radius-luminosity relation, 27
- Random-walk effect
 - in solar nebula, 274
 - in solar structures, 14
- Ranger 5, 335, 482, 517, 520
- Rapid rotators
 - binary stars, 33, 34, 36
- Rare-earth glasses
 - as optical material, 64
- Rayleigh criterion
 - rotating fluid, 475
- Ray structure
 - in Sun, 216
- Ray tracing
 - methods, 72
 - through solar corona, 218
- R Cma, 99
- RCW sources
 - OH in, 190, 192, 193
- Reaction cross section
 - in gamma-ray production, 485, 486
- Reaction rates
 - nuclear, 525-70
- Reciprocity theorem
 - for nuclear reactions, 526, 529, 563
- Recoil photons
 - specific intensity, 336
- Recombination
 - and cosmology, 630, 645
 - lines
 - coronal, 247, 337
 - hydrogen, 191, 193, 318
 - radiative, 296
 - solar nebula, 272
- Red-corrected lenses, 51
- Reddening corrections
 - for binaries, 28
- Red-giant branch
 - in stellar evolution, 577, 583, 593-95, 611, 616, 619, 620, 624
- Red-line observations
 - coronal, 221
- Redshift-apparent magnitude relation
 - QSO's, 430
- Redshift-radio-flux correlation
 - QSO's, 430
- Redshifts
 - and cosmology, 627, 629, 634, 635, 645
 - of QSO's, 400, 402, 403, 408, 410-11, 412, 417, 418, 427, 430, 431
- Red supergiants
 - and stellar evolution, 609, 610
- Reference interferometers, 164
- Reflectance
 - of etalon, 141, 181
- Reflecting telescope, 45, 50
- Reflection effects
 - in corona, 244
 - in hydrodynamics of stellar atmospheres, 69, 80
- Reflection polarization, 167
- Refracting telescopes, 45, 55
- Refraction effects
 - in corona, 218
 - in hydrodynamics
 - of stellar atmospheres, 69, 82
- Refractive index
 - for astronomical optics, 46, 57, 161, 162, 516
- Reimaging techniques, 58, 60-61
- Relative frequency
 - of binaries, 30-42
- Relativistic astrophysics, 627
- Relativistic degeneracy
 - in stellar evolution, 579
- Relativistic instability, 442
- Relativistic particles, 321, 322
- coronal, 257
- gamma rays, 485, 488, 495
- in QSO's, 424, 426, 435, 438, 443
- solar, 359, 368
- X-ray, 329, 337, 338, 339
- Relativistic singularity, 643
- Relativity, 629
 - theory of, 627, 633
- Relaxation processes, 70
- Relaxation techniques
 - in stellar evolution, 571
- Relict radiation, 627, 629, 632, 635-37, 642
- Residuals
 - for velocity-curve
 - in binaries, 33
- Resolving limit, 143, 157
- coronal observations, 332
- Resolving power
 - solar observations, 139, 279
 - of a telescope, 57-58
- Resonance lines, 296, 300, 305
 - absorption, 291
 - coronal, 257
- Resonance effects
 - in hydrodynamics of stellar atmospheres, 69, 77-78, 248, 326
 - nuclear, 538
- Resonance scattering
 - corona, 254
- Resonant-reaction data, 545-49
- Rest frame
 - and cosmology, 634
 - and redshift analysis, 413
- Rest frequencies
 - OH transitions, 184, 186
- Rest-mass energy
 - electrons in gamma-ray
 - production, 492
 - as a source for QSO's, 441
- Retardation
 - optical, 143
- Retrograde orbits
 - of comets and corona, 241
 - planets, 267
- Reverse reactions, 550, 555-62
- Riemann ellipsoids
 - rotating fluids, 467
- Riemannian geometry, 629
- Rigid rotation
 - of fluids, 466
 - of solar corona, 238, 241, 248
 - stellar evolution, 603
- Rings
 - coronal, 306
- Riometer studies, 352, 354, 355
- R-matrix theory, 552, 553, 555

- Roche limit, 476, 478
 Roche pattern, 469-70, 471
 Rocket observations, 163
 and cosmology, 629
 gamma-ray, 512
 solar XUV, 279, 281, 283,
 287, 293, 295, 353
 X-ray, 325, 326, 329, 333,
 334, 348, 382
 Ross 614, 116, 131
 Rotating fluid masses, 465-80
 dynamics of, 453
 oscillating, 472-78
 steady-state, 465-72
 subadiabatic temperature
 gradient, 474
 Rotating telescopes, 168
 Rotation
 of binaries, 30-42
 planets, 267
 of solar corona, 238
 Sun, 267
 Rotational broadening
 of spectral lines
 in binaries, 34
 Rotational instability
 of protostars, 37, 39, 273,
 276
 Rotational levels
 CO, 287, 289
 OH, 183, 204
 Rotational lines
 CN, 157
 see also other molecules
 Rotation effect
 in cluster binaries, 124
 in stellar evolution, 602-6
 in Sun, 20
 Rotation measure, 175-77
 Rotation parameters
 stellar evolution, 604
 Rotation period
 of interplanetary magnetic
 pattern, 15
 r process, 500
 RR Lyn, 97
 RR Lyrae stars
 and stellar evolution, 615,
 621, 622, 624
 RS CVn, 90, 98, 99, 101
 RS Vul, 98
 RT Lac, 99
 RX Gem, 99
 RX Her, 97, 101
 Ry Gem, 99
 Ry Per, 98
 RZ Cnc, 99, 101
 RZ Oph, 99

 S
 Sagittarius A
 gamma-ray, 510
 OH absorption in, 188, 192,
 193, 207, 208, 330, 331,
 332
 Sagittarius arm
 OH radio observations, 191,
 193, 208
 Sapphire
 synthetic
 as an optical material, 64
 Satellite lines
 OH, 186, 190, 193, 194,
 201, 203, 209
 Satellite observations, 15
 cosmic rays, 170, 481
 coronal, 213, 234, 263
 gamma-ray, 512
 solar, 279, 352, 360, 365,
 371, 376, 382
 Satellites
 of planets, 267, 268, 270,
 272, 275, 277, 278
 Saturation
 of lines
 interstellar, 139
 OH, 188, 200, 201, 204,
 209, 210
 maser, 172
 path length, 205
 Saturn, 267, 270, 273
 Saturnian satellites, 272
 Scalar fields, 646
 and cosmology, 633
 Scale
 of solar fields, 1, 2, 3, 11
 Scale height
 in stellar atmospheres, 72
 in stellar evolution, 617
 Scale parameters
 galactic magnetic fields,
 168
 Scandium, 290, 383
 solar, 292
 Scanners, 140
 Scanning comparators, 88
 Scattering
 by solar corona, 218, 226,
 230, 232, 233, 234, 296
 X-ray, 330
 Schönberg-Chandrasekhar
 limit in stellar evolution,
 576, 592, 594
 Schwarzschild criterion
 for rotating fluids, 474, 475
 Schwarzschild interior
 solution, 411
 Schwarzschild radius, 441,
 442
 Schwarzschild sphere, 643
 Scintillation-counter array,
 516, 517
 Scintillation counters
 gamma-ray, 512, 513, 514,
 515, 516-17, 519
 Scintillation observations
 in QSO's, 425, 426
 solar corona, 231, 233, 234
 μ Scorpii, 40
 Scorpius XR-1, 519
 Scorpius X-ray sources, 329,
 333, 335, 337, 341-45,
 500
 Sco X-2, 334
 Sco X-3, 334
 Screening
 complete
 nuclear, 493, 495
 nuclear, 526
 transitions, 284
 Scutum arm
 OH radio observations, 191
 Sea-level neutron monitor,
 354, 355
 Secondary cosmic rays, 170,
 387, 486, 508, 511
 Secondary optics, 54
 Secondary spectrum
 of binary, 33, 35
 Sector pattern
 in solar structure, 15
 Secular instability, 469
 Secular variation
 X-ray source, 335-36
 Seeing, 144
 and astronomical optics, 56
 coronal, 233
 and solar observations, 2
 Selection effects
 in binaries, 25, 29, 30, 33,
 36
 in coronal observations, 224
 in QSO's, 436
 Selection rules
 nuclear, 557
 for OH transitions, 203
 Selective absorption
 OH, 205
 Selective modulator, 160
 Self-absorption, 296
 synchrotron radiation in
 QSO's, 425, 431, 433
 Self-confined plasmas, 345
 Self-gravitation
 in cosmology, 642
 in disk galaxies, 459
 in fluid masses, 465
 Self-reversed transitions, 284
 Semidetached systems
 of binaries, 36
 Separation of variables
 dynamics of disk galaxies,
 458, 459
 Servo-controlled optical
 alignment, 280
 Ser X-1, 334, 345, 346
 Seyfert galaxies, 407, 416,
 417, 234, 447
 Sgr B2
 OH, 190, 192, 195, 196,
 198, 199, 209, 210
 Sgr X-1, 334
 Sgr X-2, 334
 Sharp-lined stars
 binary, 33
 Shear flow
 stellar atmospheres, 79
 Shearing effects
 differential rotation, 12
 Shear instability

- in rotating fluids, 475
- Shell-burning phases
 - in stellar evolution, 574-77, 578-80, 583, 610
- Shell narrowing
 - in stellar evolution, 583, 593, 603, 612, 613
- Shielded ion chambers, 351
- Shock fronts
 - in galaxies, 169
 - and X rays, 345
- Shock-tube spectroscopy, 287, 296
- Shock waves, 81-83
 - in QSO's, 440
 - in the solar corona, 236, 248, 249, 252, 386, 387, 388
 - in spiral galaxies, 461
 - in stellar atmospheres, 67-83
- Short-focus instrument, 46
- Short-period variables, 28, 29, 32, 112
 - see also Close binaries
- Showers
 - charged-particle, 516, 519
- Signal-to-noise ratio
- astronomical optics, 56
- gamma-ray detectors, 515
- interferometry, 157
- Silica
 - see Fused silica
- Silicon, 293, 294, 561, 564, 565, 568
 - nuclear reaction, 526
 - in QSO's, 407
 - solar, 281, 282, 283, 284, 285, 286, 287, 291, 292, 298
- X-ray absorption, 327
- Silicon-burning stage, 526, 564-65
- Silver bromide emulsions
 - as gamma-ray detectors, 513
- Similarity method, 81
- Single disk measurements
 - radio OH, 197
- Single-lined binaries, 86, 87
- Single-pass spectrograph, 306
- Single-spectrum binary, 34, 35
- Singularity
 - cosmological time zero, 632-33, 641-43
 - of spiral structure, 457
- Sirius group, 112-15, 130
- S.I.S.A.M. method
 - of interferometry, 159
- Sixth Catalog of Orbital Elements of Spectroscopic Binary Systems, 32
- Sky background
 - and optical astronomy, 62
- Skyhook balloon observations, 352
- Skylark rocket, 28, 282, 287, 308
- Slit spectrograph, 139
- Small Magellanic Cloud
 - Cepheids in, 607
- Small-scale magnetic fields
 - solar, 3-11
- SN 1572, 332
- SN 1604, 332
- Sodium, 548, 560, 561, 568
- Sodium D lines
 - in binaries, 90, 92
 - coronal, 245
 - interstellar, 155, 159
 - solar, 7
- Sodium lamp
 - as calibrator, 155
- Soft X radiation, 310
- extrasolar, 325
- Solar atmosphere
 - structure, 1
 - waves in, 67-83
- Solar cosmic rays, 488
- Solar cycle, 298, 353
- Solar envelope, 268
- Solar fields
 - size, 2, 3, 11
- Solar imaging, 308-11
- Solar magnetic fields, 169
- observations, 1-24
- Solar magnetograph, 1, 2
- Solar modulation
 - cosmic radiation, 488
 - of cosmic rays, 170
- Solar monitoring, 311-18
- Solar nebula, 269
 - melting in, 278
- Solar neighborhood
 - polarization in, 168
- stars in, 37, 116, 123
- Solar neutrino observatory, 563
- Solar-particle flux, 351-97
- Solar system
 - gamma rays, 511
 - origin of, 267-78
- Solar telescope, 56
- Solar ultraviolet, 279-324
- Solar wind, 213, 215, 228, 231, 234, 236, 237, 240, 259, 262
 - and particles, 371, 373, 380, 389
- Solc filter, 308
- Solenoids
 - in astronomical optics, 58
- Solid-state detector, 381
- solar-particle, 365
- Solrad satellites, 314
- Sound
 - absorption of
 - in fluids, 71
 - waves
 - in rotating fluids, 474
- Sounding rockets
 - solar-particle measures, 382
- and solar XUV spectrum, 279, 313
- X-ray, 325
- Source counts
 - QSO's, 431
- Source function
 - solar-particle, 370
- Source strength
 - gamma-ray production, 484, 494, 505, 506
- Southern Hemisphere binaries, 97
- Spacecraft observations, 163
 - coronal, 213, 219, 228, 233, 240, 242, 245
 - cosmic-ray, 170
 - solar, 3
 - X-ray, 352, 365
 - see also Satellite
- Spark chambers
 - gamma-ray detectors, 513, 514, 515, 519
- Spatial distribution
 - of binaries, 30, 118
- Spatial resolution, 381
 - of solar observations, 11
- Specific entropy, 633
- Specific heat
 - of optical materials, 62
 - of rotating fluids, 473
- Spectral density
 - frequency-wavenumber plane, 76
- Spectral index
 - gamma-ray, 488
 - QSO's, 428, 427
 - radio, 171
- Spectral range, 141
- Spectral resolution, 293, 329
- Spectral shape, 339
- Spectral type
 - of binaries, 30, 36, 95
- Spectrasil, 160
- Spectrocinematograph, 148
- Spectrograph
 - high-dispersion, 2
 - optical, 53, 57-66
- Spectroheliograph
 - coronal, 223, 229
 - solar, 3, 148
 - UV, 306
- Spectroscopic binaries, 25, 26, 30, 32, 36, 42, 85, 92, 97, 116
- Spectrum lines
 - solar, 2, 5
 - see also Absorption lines; Emission lines
- Spectrum scanners, 1-2, 53
- Spherical aberration, 46, 49, 50, 51, 59
- Spherical harmonics
 - in rotating fluid, 473
- Spherical waves
 - in stellar atmospheres, 67
- Spheroidal coordinates
 - in disk galaxies, 455, 461

- Spicules, 7
 and corona, 229
 Spin statistical factors
 nuclear reactions, 529
 Spiral
 arm
 binaries in, 100
 local, 168, 179, 191
 OH in, 208
 solar field, 371, 390
 Spiral structure
 of galaxies, 453, 456, 457
 Spontaneous decay
 and cosmological implications, 628, 631
 lifetime
 nuclear, 529
 Spontaneous line emission, 296
 Spontaneous transitions
 in OH, 200, 201
 Sporadic condensation
 solar coronal, 216, 221, 223, 225, 228, 237, 248
 Spray prominences, 255
 SS Boo, 99, 101
 Stability
 of optical systems, 63, 140
 of proto-planets, 268
 of rotating fluids, 465, 472-78
 of solar structures, 14-15
 of spiral arms, 179
 of stellar atmospheres, 68
 see also Instability
 Star clusters
 and QSO's, 414
 Star formation
 binary systems, 37-42
 in disk galaxies, 463
 see also Protostars;
 Stellar evolution
 Stars and Stellar Systems, 453
 Statistical studies
 of galactic field, 168, 177
 Statistical weights
 nuclear, 557, 637
 OH, 185
 solar, 297
 Steady-state solutions
 cosmological, 632, 633
 rotating fluids, 465-72
 solar wind, 241
 Steady-state universe
 and QSO's, 431, 432, 433, 445, 446
 gamma-ray observations, 520
 Stellar associations, 37
 Stellar atmospheres
 and binary stars, 123
 and model stars, 615
 solar, 1
 waves in, 67-83
 Stellar collisions
 and QSO's, 441
 Stellar dynamics
 in disk galaxies, 459
 Stellar envelopes, 577
 Stellar evolution, 525
 and binary stars, 38, 87, 95
 on and off the main sequence, 571-624
 and QSO's, 440
 see also Evolution; Solar System
 Stellar interiors
 and binaries, 95
 and rotating fluids, 475
 Stellar magnetic fields
 solar nebula, 273
 Stellar masses
 from binaries, 26, 42, 86-103
 Stellar models
 rotating fluid, 472
 Stellar sheet model
 of disk galaxies, 455
 Stellar wind, 240, 241
 Stigmatic spectrograph, 281
 Stimulated transitions
 and maser action, 200, 202
 X-ray, 337
 Stokes parameters, 172
 Storage mechanisms
 high-energy particles, 352, 395
 Storm
 magnetic, 11, 17
 Stratification, 475
 Stratified atmosphere
 hydrodynamics of, 68, 71
 Streamers
 coronal, 216, 220, 223, 224, 225, 227, 228, 231, 236, 237, 241, 242, 243, 246, 250, 260
 Streaming angle
 for interplanetary field, 234
 Strömgren sphere
 solar, 252
 Strong interactions, 482, 483, 505-6, 562
 Structure
 in solar atmosphere, 1, 2, 9
 Subdwarf
 binaries, 108
 QSO's, 402, 403
 stellar evolution, 614, 615, 617
 Subelementary particles, 628
 see also Quarks
 Subflare activity, 318
 gamma rays, 511
 Subgiants
 in binary systems, 41, 85, 98, 119-23
 stellar evolution, 614, 618
 Sudden ionospheric disturbance, 316
 Sulfur, 561, 565
 nuclear reactions, 526
 in QSO's, 407
 solar, 292, 298, 299
 X-ray absorption, 327
 Sun
 energetic particles from, 351-97
 magnetic field of observations, 1-24
 Sun-Sirius
 mass-luminosity relation, 115, 118, 124
 Sunspot cycle, 1, 12, 14, 20
 and corona, 215, 217, 218, 220, 240, 267
 and high-energy particles, 355, 365
 Sunspot polarity
 law of, 14
 Sunspots
 observations of fields in, 1, 4
 Supercluster
 of galaxies, 490
 Superdense objects, 445
 see also Superstars
 Supergiants
 binaries, 99
 nuclear reactions, 526, 564
 and stellar evolution, 609, 621
 Supergranulation, 1, 6, 9, 14, 17
 and corona, 236
 Supernova explosions, 440-41
 nuclear reactions, 526
 and QSO's, 414
 Supernova remnants
 and gamma-ray production, 500
 and OH, 189, 209
 and X-ray emission, 332, 335
 see also W classifications
 Supersonic solar wind, 252, 261, 388
 Superstars
 collapse of, 442
 and QSO's, 441-42
 Surface brightness
 of QSO's, 427
 Surface temperature
 and stellar evolution, 581, 582, 588, 590, 593, 618, 621
 S-wave interaction, 533, 536, 550
 SW CMA, 97
 Synchronous scanning, 153, 157
 Synchrotron emission, 368, 385, 386, 388
 galactic, 167, 170, 172, 173
 and gamma-ray production, 485, 489, 496, 508, 521
 from quasars, 415, 417, 419, 420, 434, 438, 439, 442
 solar, 321
 coronal, 216

- and X-ray production, 338-39, 341, 345
 - Synchrotron self-absorption, 425, 431, 433, 447
 - Synoptic chart, 13
 - Synoptic magnetic observations, 11
 - coronal, 213, 227, 239
 - Synthetic optical materials, 64
 - SZ Cen, 97
 - SZ Psc, 99
- T
- Tails
 - of comets
 - and solar wind, 240, 241, 245
 - Target nucleus
 - in reactions, 527
 - Tau A
 - gamma rays from, 510, 521
 - OH in, 192
 - X rays from, 332
 - ω Tauri, 31
 - Tautenberg telescope, 55
 - Tau X-1, 330, 334, 348
 - Telemetering monochromator, 285
 - Telescopes
 - prime focus of, 50, 51, 54
 - Temperature fluctuations
 - in stellar atmospheres, 69
 - Temperature profiles
 - solar, 80
 - Temperature scale
 - for binaries, 119
 - coronal, 213, 247-53
 - Terrestrial abundances
 - and coronal, 213
 - isotopic, 206
 - Terrestrial planets, 267, 270, 272, 277
 - Tessar anastigmat, 46
 - Thallium-activated detectors
 - gamma-ray, 512
 - Thermal bremsstrahlung, 338, 340, 347
 - Thermal broadening
 - in OH, 186, 190
 - Thermal-capture cross
 - section, 536
 - Thermal conductivity
 - coronal, 248
 - of stellar atmospheres, 71
 - Thermal emission
 - coronal, 247, 255
 - galactic, 174
 - QSO's, 419
 - X rays, 340-41
 - see also Nonthermal emission
 - Thermal instability
 - in stellar evolution, 580
 - Thermal sources
 - OH emission, 183
 - Thermodynamic equilibrium, 70
 - and background radiation, 532, 627, 637, 645
 - and OH, 186, 209
 - Thermodynamics
 - of stellar atmospheres, 67, 69-71
 - Thermonuclear reactions
 - in cosmology, 640
 - in gamma-ray production, 498-99
 - rates, 525-70
 - Thetatron, 288
 - Thiele-Innes method, 106, 107
 - Thin-disk model
 - for galaxy, 453-54, 460
 - Third Catalogue of Spectroscopic Binaries, 89
 - Thirring-Lense effect, 634
 - Thompson scattering
 - coronal, 216
 - interstellar, 328
 - in QSO's, 438
 - Thorium oxides
 - for photographic materials, 64
 - Three-color photometry
 - analogy with rocket, 329
 - Three-photon annihilation, 505
 - Threshold
 - nuclear reaction, 560
 - for pair production, 492, 493
 - of particle detectors, 352
 - p-p' reaction, 499, 500, 503, 504
 - Tidal forces
 - in close binaries, 3, 32
 - in cosmology, 642
 - in disk galaxies, 457
 - in rotating fluids, 476
 - Titanium, 383
 - solar, 292
 - Titus-Bode law, 267, 268, 270, 278
 - Ton 236, 402
 - Ton 256, 406, 408
 - Ton 469, 405
 - Ton 1530, 405, 409
 - Topology
 - of galaxy, 167, 168, 179
 - Trailing spirals, 457, 461, 462
 - Transbismuth elements
 - in supernova explosion, 500
 - Transducers, 163
 - Transfer equation
 - OH, 201
 - Transition frequencies
 - OH, 184
 - Transition region
 - of solar atmosphere, 280, 296, 297, 299
 - Transit time
 - solar particles, 391
 - Transmission factor
 - for stellar atmospheres, 76, 80
 - Transmission optics, 64, 308
 - Transmission velocity
 - in fluids, 411
 - Transmittance
 - of etalon, 141, 150
 - Transverse hydromagnetic waves
 - in solar corona, 238
 - Transverse Zeeman effect
 - solar, 2
 - Trigonometric parallax
 - of binaries, 85, 114, 118, 124, 125
 - stellar evolution, 615
 - see also Parallax
 - Triple α -process, 558
 - in stellar evolution, 577, 594, 596
 - Tritium-burning reactions, 562
 - Triton-to-proton ratio, 365
 - Tritons, 272
 - T-Tauri stars
 - and planetary formation, 272
 - TU Mon, 98
 - Tunable filter
 - interferometer as, 147-48
 - Turbulence
 - atmosphere and optical observations, 63
 - coronal, 247
 - in disk galaxies, 459
 - and QSO's, 442, 443
 - solar nebula, 274, 275
 - stellar
 - noise generated by, 68
 - and stellar evolution, 605, 623
 - Turnoff
 - main-sequence, 614, 615, 618, 620, 621, 622
 - TV Cet, 90, 91, 101
 - Two-armed patterns
 - spiral structure, 462
 - Two-beam interferometers, 140
 - Two-body motion
 - and binary systems, 41, 42
 - Two-color photometry
 - analogy with rocket, 329
 - and QSO's, 400, 401, 402
 - see also Photometry
 - Two-dimensional classification
 - of binaries, 27, 28
 - Two-dimensional filter
 - photography, 147
 - Two-dimensional observations
 - of solar magnetic fields, 3

- Two-directional counting
 solar particles, 371
Two-photon annihilation, 505
TX Her, 100
Type I bursts, 256, 257, 365
Type II bursts, 223, 224, 225,
 256, 356, 365
Type III bursts, 222, 223,
 224, 225, 231, 250, 252,
 256, 265
Type IV bursts, 256, 257,
 352, 365, 368, 376, 385,
 386, 388
Type I comet tails, 245
Type S ellipsoids, 468
Type I supernova, 500
 remnants, 332
- U
- U-B
 for binaries, 28
 for QSO's, 417
UBV colors
 for QSO's, 400, 401, 416,
 418, 430
U Cephei, 36, 98
U Gem stars, 100
Uhrstars, 631, 635
Utsel, 160
Ultraviolet excess
 in binaries, 97
 in QSO's, 400, 401, 403
Ultraviolet observations, 248
 coronal, 213, 221
 solar, 279-324
Ultraviolet pumping
 of OH, 203, 204, 205, 209
 ζ UMa, 88
 ϕ UMa, 129
Uma Cluster, 112-15, 129
UMR, 11, 12, 15, 16
Unipolar regions
 solar, 11
Unstable protostars
 and binary systems, 37
U Oph, 92, 98, 101
Upper main-sequence stars
 binary, 25
Uppsala Schmidt telescope,
 198
Uranian satellites, 272
Uranus, 267, 270, 273, 276,
 278
 ζ Ursae Majoris, 31
U Sge, 98
Utrecht model, 70, 295, 296
UU Cnc, 99
UV Cet, 118, 119, 129, 130
UV Leo, 96, 101
- V
- Vanadium
 solar, 292
V805 Aql, 92, 93, 94, 97
Variable radio sources, 403,
 419, 420-24
Variable stars, 571
 binaries as, 28, 99
 pulsation theory of, 473
Variational principle, 269,
 270
 of rotating fluids, 471,
 472, 478
V444 Cyg, 98
V448 Cyg, 98
V477 Cyg, 97, 101
Vector magnetograph, 7
 ψ Vel, 109, 126, 127
Vela satellite, 314
Velocities
 characteristic
 on solar surface, 9
 of rotation
 of binaries, 32, 33
Velocity-curve
 for binary, 33, 34, 85
Velocity dispersion
 in disk galaxies, 459, 460
Velocity fields
 solar atmosphere, 75, 77
Velocity-position relation
 in rotating fluids, 467
Venus, 267, 272
 orbit of
 observations from, 219,
 220
Vertical magnetic fields
 solar, 4
Vibrational states
 OH emission, 203, 204
Vidicon spark chamber
 as gamma-ray detector, 515
Vidicon system, 149
 in solar observations, 3
Vignetting
 in Fabry-Perot signal, 152
 α Vir, 95
Vir A, 331
 gamma-ray, 510, 521
Virgo cluster, 438
Virial equations
 for rotating fluids, 478
Virial tensor method
 for rotating fluids, 476
Virial theorem, 86, 169,
 572, 590
 and QSO's energy, 444
Vir X-1, 334
Viscosity
 and solar corona, 246, 255
 and solar nebula, 269
Viscous dissipation
 in stellar atmospheres, 71
Visual binaries, 25, 26, 42,
 85, 88
 masses of, 105-39
 von Zeipel's theorem, 466-
 67
V451 Oph, 97, 101
Vortices system
 for planetary formation,
 268
- Vorticity
 in rotating fluids, 468, 476
V Pup, 98
V356 Sgr, 98
V477 Sgr, 99
15 Vulpeculae, 31
VW Cephei, 39
VZ Hya, 97, 101
- W
- Wave patterns
 disk galaxies, 455
Waves in solar atmosphere,
 67-83
Weak interactions, 483,
 562, 645
White dwarfs
 observations and astronomi-
 cal optics, 55
 and QSO's, 400, 402
 and rotating fluids, 471,
 472
Wilson-Bappu effect, 125
Windowless photomultipliers,
 286
Wire chamber
 gamma-ray detector, 515
WKB method
 see JWKB method
Wolf 630 group, 121
Wolf-Rayet stars
 in binaries, 30, 98
W sources
 OH in, 187, 188, 189, 190,
 191, 192, 193, 194,
 195, 196, 197, 199,
 200, 201, 202, 206,
 207, 209, 210
W systems
 binaries, 28, 29
W UMa stars, 96
W Ursae Majoris stars
 and solar nebula, 276
W Ursae Majoris systems,
 27, 28, 29, 32, 36, 39
WW Aur, 97, 101
WW Dra, 99, 101
WZ Oph, 97, 101
- X
- X-ray bursts, 358, 360,
 396
X-ray crystal spectrometer,
 286
X-ray emission, 482
 and gamma rays, 519
 mechanisms, 337-41
 and supernovae, 500
X-ray flares, 315-18
X-ray imaging, 308-11
X-ray observations
 coronal, 213, 217, 221,
 223, 225, 227, 248
 solar, 279-324
X-ray scattering, 337

SUBJECT INDEX

691

X-ray sources
 extrasolar, 325-50, 494
 XUV spectrum
 solar, 279-324
 XY Pup, 99
 XZ Sgr, 98

Y

Y Cyg, 98, 100, 101
 Yellow-line
 coronal observations, 221
 Yerkes refractor, 105
 Young clusters

and binary stars, 32
 and stellar evolution, 606-
 11
 Young's modulus
 for optical materials, 63
 YY Gem, 29, 96, 101

Z

Zeeman effect
 in galactic polarization,
 168, 171-72
 in OH, 193
 in Sun, 2, 148, 253, 257

Zero-age main sequence,
 121
 and stellar evolution, 586-
 90, 591, 597, 602, 605,
 614, 615, 621
 Zeta discharge, 288
 Zeta transitions, 290
 Z Her, 90, 98, 99, 101
 Zodiacal light, 216
 Zurich smoothed sunspot
 number, 335
 Z Vul, 98, 101
 ZZ Boo, 97, 101
 ZZ Cep, 98